

Railway Age

Vol. 64 February 22, 1918 No. 8



This French Gun Will Be Ready for the Germans in the Spring. Photo by Central News Service.

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CHICAGO: Transportation Building. CLEVELAND: Citizens Building. WASHINGTON: Home Life Building.

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EDITORIAL



The express companies are being hard hit as is indicated by the returns for the ten months ended with October. The

Express Companies Hard Hit

Adams had an operating deficit of \$1,880,000 as against operating income for the corresponding ten months of 1916 of \$933,000. American and Wells-Fargo suffered almost as much; the former had an operating income of \$940,000 in 1917 as against \$2,125,000 in 1916, and the Wells-Fargo an operating income of \$699,000 in 1917 as against \$2,634,000 in 1916. The express companies' gross business was very much larger in 1917 than in 1916 and the amount they had to pay out for express privileges (amounts paid to the railroad companies) increased only in proportion, so that the amounts available to pay operating expenses were much larger in 1917 than in 1916. The expenses mounted up out of all proportion, however, to the increase in business handled. It is well known that a great many shipments which would under ordinary circumstances have gone by freight have been, during the past year, sent by express. The express companies' organization has not been capable of handling this business economically; loss and damage claims have amounted to unprecedented figures; correspondence has in some cases more than doubled. Everywhere the bad effects of congestion have been reflected in increased expenses; hay and grain have increased greatly in price; and the efficiency of express labor has fallen off until the average with some companies is probably not much above half what it was two years ago. The reason for this labor situation is two-fold. Even if the express companies had not had to handle the great increase in business, the depletion of their employees' ranks through the operation of the draft, and the more attractive offerings made by other industries, would have necessitated the hiring of so many new men, that the standard would have been very much lowered. There is added to this, however, the great increase in business. This still further diluted the old carefully trained forces with new inexperienced men. Because of these conditions, it is not surprising that there is so little opposition on the part of shippers to the requests of the express companies for higher rates.

Commissioner George W. Anderson of the Interstate Commerce Commission is one of the closest advisers of Director

The Alleged Disloyalty of Railway Men

General of Railroads McAdoo. He is at the same time a public official who, while he means to be fair, is not disposed to give railway owners and officers any more than their due. Therefore some remarks he made before the Traffic Club of New England on February 12 are significant as indicating not only his own attitude but that of government officials. He referred to the fact that "there are all kinds of nasty remarks afloat as to bad faith on the part of railroad officials and railroad employees—of an alleged desire that federal control be a failure—stories that they are holding up trains, allowing congestions to take place and doing other things to impede traffic." "I want to make my position on that entirely clear," said Commissioner Anderson. "I do not

believe those stories." Mr. Anderson's remarks on this subject are published elsewhere in this issue. He recognized the fact that "the men operating the railroads will make mistakes. They must reorganize their mental processes and their mental habits and readjust them to the new status during the war period. Some of them will not do it easily." He had no doubt, however, that practically all railway officers and employees are loyal. It would certainly be a remarkable thing if railway officers and employees were not loyal. Many of the officers of the railways have sons in the army. All of them have many friends and acquaintances "over there." The same thing is true of railway employees. The railway regiments, composed of railway officers and employees who voluntarily enlisted were, we believe, the first American soldiers actually under fire in France. The officers and employees who have stayed on the railways are as loyal and patriotic as those who have gone into the army. They showed their patriotism before government control was adopted by exerting themselves to move the maximum possible amount of business. They have shown it since by giving the best support they could to the Director General of Railroads. No baser or falser charge ever was made than that either from disloyalty or desire to discredit government control railway officers and employees have been "lying down."

With the approach of Engineering Week, as the third week in March is known among railway men, with its annual

Conventions in War Time

meeting of the American Railway Engineering Association, its stated meeting of the Railway Signal Association and the annual exhibit of the National Railway Appliances Association, more than the usual amount of interest is being displayed in these meetings this year. Never have these organizations met under as unusual and as strenuous times as the present. Approximately 100 members of the American Railway Engineering Association, or almost ten per cent of the membership, have entered the military or naval service of the country since the last meeting and similar records have been made by the other associations. This exodus has occurred at a time when the demands for trained men on the railways are the greatest ever experienced. As a result there have been a larger number of changes in personnel and more men have been installed in new positions than in any previous year. This condition not only presents an opportunity for these associations to be of real educational service to these men and to the roads which employ them but it places a heavy responsibility upon these organizations to perform this service. The need for relief is not, however, confined to the novices in the field, for the older and more experienced men are also confronted with experiences which are equally new to them. Problems have arisen during the past 12 months which are without precedent in character or in severity. There is no more loyal group of officers in railway service than those in charge of the maintenance of way department. Since the government has taken over the operation of the roads as a military measure to help win the war, the spirit of loyalty to country is now added to that to employer. To serve both most loyally now requires the

maximum of efficiency and this can only be secured by the freest exchange of ideas regarding the best methods and appliances. The American Railway Engineering Association and the Railway Signal Association are preparing programs designed to be of the maximum service to their members in meeting the new conditions and sufficient opportunity will be offered for a discussion of present day problems, which should be of great value. The exhibitors at the Coliseum have an equal opportunity to further the interest of the railways in this time of stress by making their exhibits as educational as possible and by placing special emphasis on those of their products which will aid the roads in maintaining their properties under existing conditions. With these meetings definitely assured, we believe that the railway engineers of the United States and Canada can be of no greater service to their roads than by availing themselves of the opportunities of attending these meetings.

While the subject of standardization of locomotives and cars is being discussed, railway officers and railway supply

**Standardization
and Existing
Equipment**

men who are concerned about the outcome should keep in mind one very important fact. This is, that, regardless of the standards adopted for new equipment, there are already in service 66,000 locomotives and about 2,500,000 freight, passenger and work cars. The maintenance of these existing cars and locomotives, and the installation of devices, especially in the case of locomotives, to make them more serviceable, will necessitate a very large part of the total expenditures made by the railways for materials and supplies for years to come. The materials and devices bought for the maintenance or improvement of existing equipment will be much the same as they would have been if government control had not been adopted; and in the main the same railway officers will specify and buy them who heretofore have done so. There will be supervision of all purchases from Washington, as there will be supervision of all parts of management and operation; but that there will be revolutionary changes in the relations between the railroads and the railroad supply business in general is improbable. In fact, without distributing business widely among the plants of the railway supply manufacturing concerns, the railways even under government control could hardly get all the materials and supplies that will be required by them.

The Report on Stresses in Track

THE ACTION of tracks under traffic is complex. Even the distribution of the load of a single pair of wheels through the rails, ties and ballast to the roadbed is accompanied by complications. For this reason track design has generally followed empirical lines while the various analytical treatments advanced from time to time, have not received general acceptance since they have usually suffered from a lack of rigid mathematical proof or the support of reliable experiments. The need for a thorough establishment of the mechanics of track has been sorely felt by students of rails, ties and other component parts of the track structure, and expressions of opinion along this line by interested committees of the American Railway Engineering Association and the opinions of others vitally concerned, crystallized about five years ago in the establishment of a Special Committee on Stresses in Track composed of members of the American Society of Civil Engineers and the American Railway Engineering Association under the leadership of Professor A. N. Talbot, of the University of Illinois.

The efforts of this committee have now borne fruit in a report published in the Proceedings of the American Society of Civil Engineers for January, 1918, which is abstracted on another page of this issue. While not complete, it is sufficiently conclusive to demonstrate that the committee had been working in the right direction. Introducing a mathematical analysis of track action that is unusually simple, considering the complex subject, the committee has directed its efforts, through a comprehensive series of tests, to an evaluation of the several variables encountered in this analysis.

The results are illuminating, for definite numerical values are submitted to express variations in the rigidity or stiffness of track with different weights of rails, sizes of ties, kinds and depths of ballast, etc. One particularly interesting discovery is that the distribution of wheel-loads to the ties is much more uniform than was generally supposed. The data are not sufficiently complete as yet to cover all classes of conditions, but sufficient information is now available to indicate what may be expected with a continuation of this work.

The Government Locomotives

ECONOMY IN TRAIN OPERATION demands that careful study be given the design of the hauling unit, the locomotive, that it may be made to best suit the conditions under which it is to operate. Among the conditions which affect the design of a locomotive may be mentioned grades, curvature, weight of rail, strength of bridges, clearances, speeds, service (freight, passenger or switch), fuel and facilities for handling the locomotives at the terminals. It is obviously impossible to evolve one design of locomotive which will economically meet the variations in all of these conditions. Nor can even a few designs be made to cover them without a serious loss in operating efficiency in some cases. The government in its desire to provide locomotives must give these facts serious consideration. To build locomotives suitable for operating over a wide range of conditions, a sacrifice must be made in operating efficiency on some roads over which they will operate, and this will reduce the net income of those roads.

Granted that now, and perhaps next year, there will be a need for locomotives that can be sent indiscriminately throughout the country to relieve congestion wherever it may occur, the fact remains that where specific roads need new locomotives in any large numbers, far better results will be obtained by providing those roads with locomotives of a design that is best adapted to their particular needs. These locomotives, if built of existing designs, would serve their purpose better than any locomotive of a compromise design that it would be practical to build for a certain set of operating conditions. The number of any general service locomotives ordered by the government, therefore, should be held to a minimum—to a number which will be considered necessary to relieve congestion caused by a lack of power. The danger is in ordering more than is absolutely necessary and thus holding up orders for locomotives of special design for those roads that need them most. As conditions again become normal, and the railroads have an opportunity to adjust themselves to the new conditions, there will be no great need for these general service locomotives, and if there are too many of them it will be difficult to find places in which to use them economically.

In the development of the designs for government locomotives it must be remembered that the railroads will operate them. A locomotive builder's design is not necessarily a locomotive user's design. There are questions of operation and maintenance with which the builder only comes in

direct contact. These questions are particularly important in locomotive design—a great deal more so than in car design. Past experience has shown that many locomotives built strictly to the builder's designs have not proved entirely satisfactory when placed in operation. Any new design of locomotive is always sure to require some changes which will be indicated by its performance in service. The question of maintenance is very important. The experiences of this winter have clearly demonstrated this. No one is better able to suggest improvements in design from a maintenance standpoint than the railroad man—the man who maintains them. It is plainly evident that the railroad man's opinion should be given serious consideration in the design of the machine he is to operate and maintain, if he is to be expected to do it efficiently. He is more familiar with the conditions under which locomotives operate. He knows what is needed to alleviate the shortage of power. He is the man that is living with it and suffering for the lack of it. His counsels are necessary to the satisfactory solution of the problem.

The Standard Car

ACCORDING TO REPORTS from Washington the railroads are to have a standard freight car at last. For more than three years the American Railway Association has had a sub-committee working on designs for a standard box car. These standards have been developed by the best car designers in the country, coming from both the builders and the railroads. Every question of design from the construction and maintenance standpoint has been thoroughly discussed and on only but a few features of these designs have all the members of the sub-committee agreed. The lack of agreement on these few features is the reason that the designs have not been submitted to the American Railway Association for its acceptance, for it was felt that it was useless to submit designs without the unanimous approval of the entire sub-committee. This, of course, was right, but the sub-committee is to be criticised for not adjusting the differences of opinion among the members so that an agreement could be reached. Now the matter is to be brought to a conclusion by the Director-General of Railroads, who has appointed a committee of car builders, with S. M. Vauclain as chairman, to produce the standard car. This committee should give full consideration to the deliberations of the A. R. A. sub-committee, for there it will find important points that affect materially the maintenance of the car and the requirements of service.

The purpose of freight car standardization is to provide a car that can be maintained at a reasonable cost, that will be strong enough to fully meet the present operating conditions and that can be built economically by the builders. The proper standards must therefore be in the nature of a compromise between the builders and the railroads. By the nature of his business the builder knows which designs can be constructed most economically. Likewise the railroads know which designs better meet their needs and which can be maintained most economically. The arguments of both must be given consideration. The final design must be such that the interests of both will be properly taken care of.

In every problem of standardization the vital question is how far it should be carried. It is very important that it should not be carried to such an extent that it will discourage any designer or inventor, whether inside or outside the railroad, from seeking to improve existing designs. This would throttle development, which is absolutely foreign to American ideals. Opportunities must be left for improvements that will make the car cheaper in first cost and cheaper to maintain. Insistence must be had, however, on interchangeability and adequate strength. Our railway

equipment would not be as highly developed as it is today if it were not for those who have worked hard and spent money to produce improvements over old or existing designs. Much has been done in this respect and much still remains to be done. The gates should be left open for improvements and it is very necessary that provision be made to encourage anybody to make them. It is only right that those who do this receive remuneration for their labors, expenditures and ingenuity. To put a stop to invention, or to even discourage invention by forming rigid standards for the entire car would be a decided step backward.

How to Improve the Power Situation

THE PRESENT LOCOMOTIVE SHORTAGE may be improved in two ways—by building new locomotives and by putting the existing locomotives into better operating condition. By far the best results for immediate relief will be obtained by improving the condition of the existing locomotives. As was pointed out in these columns last week, the shortage of power is not so much the lack in the number of locomotives as it is the condition of the locomotives. To be sure, new locomotives are needed, the supply from the builders for domestic use last year being practically cut in half by the demands of our Allies. The government fully realizes this and is seeking to supply them speedily, but for immediate relief every possible step must be taken to improve the condition of existing power.

The railroads went into the winter with practically no reserve of power. The extreme traffic demands which had to be met during the past year made it impossible for them to put the locomotives in as good condition for the winter as usual. Furthermore, the labor conditions the country over were in such a state that the shop forces were constantly changing, the efficiency of the men decreased and the output of the shops was reduced. Coupled with this the severe winter with low temperatures and heavy snows made operation very difficult, increasing the wear and tear on the locomotives and greatly hampering the men in making repairs. This has led to an accumulation of locomotives at the shops for repairs to the extent that the shops of those roads which have been congested most badly are overtaxed and locomotives which should go into the shops for repairs are being operated at a sacrifice in efficiency.

The problem is—what may be done to speed up the work necessary to get the locomotives back into shape. On a satisfactory answer to this question depends the speeding up of our industrial machinery and the speeding up of the war. With the backbone of winter broken and the labor situation perhaps becoming a little more stable, an increase in efficiency in the shops may be looked for. In some cases the government will find it necessary to issue priority orders for repair material. So great is the importance of the transportation system at the present time that no road should hesitate to demand prompt deliveries, if by so doing locomotive repairs may be speeded up. In some cases it may be possible to work the locomotive shops in day and night shifts, if the necessary help can be obtained. In all cases, they should be worked to the limit. It should be possible to send locomotives from the eastern territory to western shops on roads that have not been as badly congested. Some of the locomotive builders could perhaps render assistance by taking locomotives in from adjacent roads for repairs, although if such a practice will interfere to any great extent with the production of new locomotives which will be badly needed next fall and winter, this practice is open to question. An opportunity for a great improvement is in the supervision and inspection at the shops, which, even under normal conditions, has not been adequate. With a new class of labor in the shops, which is more or less un-

familiar with railroad repair shop practice, it will be necessary to provide competent instructors or supervisors in greater numbers than has ever been the practice. Needless to say, the quality of this supervision should be of the highest. Without competent and aggressive leaders the work cannot be done efficiently. The remuneration must be sufficient to attract the best men available.

The repairing of existing equipment is the question of the hour; designs for new equipment is a question of the future. Concentrate on improving the condition of the existing locomotives.

Railroad Control Legislation

THE COMMITTEES of both houses of Congress have reported, with some changes, the railroad control bill drafted for the administration. The discussion of the proposed legislation is under way in Congress. Action by the Senate is expected this week. The original bill, which was drafted chiefly by Commissioner George W. Anderson, of the Interstate Commerce Commission, has stood criticism well. Both the Senate and the House bills are founded on it, and neither of them differs greatly from it. This is a compliment to the author, as the hearings before both committees have been thorough, and the members, while manifesting a desire to support the administration, have also shown an inclination to deal both fairly and independently with the problem.

Both committees have accepted the sound principle that, in the circumstances, the President's representative, the Director General of Railroads, should be given a very free hand so that he may control management and operation as the exigencies of commerce and of war may demand. Without a free hand the Director General would be hampered, as the Railroads' War Board was, and could not get the best results or fairly be held responsible if he did not get them. The three points which received the most attention from the committees, and to which the most discussion is being given in Congress, are the basis on which the railway companies shall be compensated for the use of their properties; what authority shall exercise the rate-making power during the period of control, and the duration of control after the war.

The original bill provided for an annual guarantee to each company equivalent to its average annual net operating income during the three years ended June 30, 1917. Attention was called to the fact that in the six months from June 30, 1917, to January 1, 1918, there had been added a substantial investment in the railways on which the proposed basis provided for no return. The house and senate bills have remedied this defect by providing for a return upon this additional investment, the rate of which shall be fixed by the President. Both bills provide, as did the original one, for a different basis of compensation to be fixed by agreement between the President and the carriers in cases where the President may find that the "standard return" would not be equitable.

The original bill provided that a reasonable return, to be fixed by the President, should be paid upon any additional investment in additions and betterments or extensions which might be made by the companies out of their own funds during the period of control. The senate committee has added a provision which reads, "that there shall be no increase of compensation for any additions, improvements or betterments constructed out of or purchased by the earnings for investment or surplus earned during the period of federal control." What does this mean? Many roads after paying out of their guaranteed standard returns their usual interest and dividends, as permitted by the bill, will have

surpluses. Under private control when a company has net operating income in excess of that paid out in interest and dividends it usually invests practically all of this surplus in its property. Does this provision mean that if the companies invest the surplus parts of their guaranteed returns in the properties they will not be paid any return upon this investment during the period of government control? If so, they will have no incentive to invest the surpluses, and the government probably will have to furnish all the new capital put into the railways. But the provision says "surplus *earned* during the period of federal control." Probably some roads during the period of control will earn their guarantees and something besides. Perhaps the word "surplus" as here used refers to this "something besides." This can hardly be, however, for in another place the bill provides that any net operating income in excess of the standard return shall be paid into the government treasury, which presumably means that it will belong to the government.

The provision regulating return upon invested surplus should be made clear, or, better still, stricken from the bill. While its effect is doubtful, the reason why it was inserted is known. It is a favorite theory of two or three members of the senate committee that railways should not be allowed to pay a return on surplus earnings invested in their properties. This may or may not be correct. But to try to give effect to the principle by adopting a provision which during the period of federal control would prevent any surplus from being invested and thereby force the government to raise all the capital needed for additions and betterments would be a mistake. It would needlessly increase the investment of the government in the railways and render it more difficult to disentangle their relations after the war. It would save the government almost nothing, because if the government has to borrow and invest capital which the railway companies might furnish from their surpluses, it will have to pay almost as much interest on this capital as it would have to pay the companies on the same amount of invested surplus.

The senate and house bills differ in their provisions regarding rate-making. The house bill gives the President—in other words, the Director General—authority to fix rates during control. The senate bill confers the authority on the President, but gives a right of appeal to the Interstate Commerce Commission. The house bill is the more logical in this respect. Under the senate bill the Director General would be held responsible for the operation and the expenses of the railways, but would not have authority to make the earnings equal the expenses. However, it is probable that the final results will be the same, no matter which provision is adopted, for it is not likely that the Interstate Commerce Commission would follow a policy in rate-making antagonistic to that favored by the President.

Perhaps the most significant provisions of the house and senate bills are those relating to the continuance of control after the war. The original bill provided that control should continue until Congress ordered otherwise. This provision was advocated and opposed upon various grounds, but the controversy over it developed into one chiefly between the advocates and the opponents of government ownership. Those opposed to government ownership criticized the provision on the grounds that if adopted it would tend to make it difficult to get the railways out of the hands of the government and that this should not be done because so great a question as government ownership should be fought out in time of peace with the result uninfluenced by legislation enacted to meet a war emergency.

This argument prevailed in both committees. The senate bill provides for control for not more than 18 months and the house bill for not more than two years after the war, and each specifically declares, "Nothing herein is to be con-

strued as expressing or prejudicing the future policy of the federal government concerning the ownership, control or regulation of carriers or the method or basis of the capitalization thereof." These provisions are mainly the expression of a preponderant sentiment against government ownership which was manifested in both committees, and the passage of either provision would be the expression of a similar sentiment by Congress. That a majority of the members of the present Congress are opposed, and strongly opposed, to government ownership has become clearer every day that the railroad control bill has been under consideration. This is a very interesting development.

The consideration of the railroad control bill has presented a marked contrast to that given to most bills relating to railways that have come before Congress during the last ten years. Perhaps the change is largely due to the fact that Congress has considered this bill in the atmosphere of war. We hope and believe it is due still more to an awakening on the part of many members to the fact that the present plight of the transportation system of the country is mainly due to an unwise policy of regulation for which Congress itself has been mainly responsible, and to a realization that the time has come when the welfare of the country demands that the railway problem shall be dealt with very differently from the way in which it has been dealt with in the past.

New Books

Principles of Ocean Transportation, by Emory R. Johnson, professor of transportation and commerce and Grover G. Huebner, assistant professor of transportation and commerce at the University of Pennsylvania. 513 pages, illustrated. Size 6 in. by 9 in. Bound in cloth. Published by D. Appleton & Co., New York. Price, \$2.50.

An up-to-the minute and exceedingly timely book on a subject which is becoming of greater and greater interest from day to day.

The United States by being compelled to build ships to combat the submarine peril is rapidly obtaining a new merchant marine and with leaps and bounds is striving for a position in ocean shipping such as it occupied before the Civil War. What are our possibilities of ultimately attaining that position and of keeping it after the peculiar economic conditions of war have given way to those of peace? The reader will find many elements of optimism in this book. He will find that a nation's ocean shipping is primarily economic. Subsidies or subventions, however much they may help or hurt, will not give a country a merchant marine, unless economic conditions are favorable to that end. In our own case, economic conditions encouraged a merchant marine until just prior to the Civil War. The destruction of American shipping in that struggle and the great transfer of ships to other flags started a decline that was assisted, or rather furthered, by our laws and by the fact that we were still using wooden ships and sails after England had gone to iron ships and steam. For 40 or 50 years after the war, America practically turned from the sea, invested her capital in the West, in the railroads, in iron and steel and other industries. In the legislative halls, ocean shipping was neglected. Neglected, nay more, it was discriminated against with navigation laws that hung like a millstone around a ship owner's neck. The law prohibiting the return to American register of ships transferred to foreign flags during the Civil War, was only one example of what was done.

But now conditions have changed. America has become a world power; she is becoming more and more interested in export trade, and if the United States has not already

reached that point, it is fast attaining a position economically favorable for a standing in ocean shipping in keeping with its export interests and industrial prowess. The United States, to take some of the examples so well brought out in "Principles of Ocean Transportation" can now produce ship plates as cheap as England. We are giving more attention to our navy; construction of naval vessels is of great advantage in the way of economies in ship building costs. We have already on the stocks the beginnings of a new merchant marine. If things go as well as they are going now, and everyone hopes that they will soon be going even better, we shall soon be able to realize the advantages of large scale standardized production of efficient merchant ships. Our tonnage rating laws no longer discriminate against American ships. We have cheaper coal. We have the Panama canal which gives us a direct route to the Western coast of South America and which brings Australia nearer to New York than to Liverpool. And what is most important, the American business man is showing a very lively interest in the possibilities of export trade and American capital is ready and available for investment in ships and shipping. Everything is not ideal, of course, for we still have the "full-crew law" of ocean shipping in the regulation that 75 per cent of a vessel's crew must understand the language of its officers—just that law that Japan must have been unbelievably pleased to have our Congress pass. The cost of operating a vessel under the American flag is higher than under most other flags, but with an industrial America interested in shipping that obstacle should not prove altogether insuperable.

The book is not a thesis, but it points irresistibly to one conclusion. That is, that the time has now come when we must take advantage of the conditions that lie before us. The book tells how—by means of favorable laws, by private ownership and by a careful and well worked out scheme of subventions. General subsidies paid indiscriminately to shipping will not do. Subventions in the form of payments for carrying the mails, let us say, to particular lines on condition that their ships meet certain high standards of size, speed, convenience and frequent sailings, have produced the desired results in England and Germany, and should do so here. The authors suggest that \$10,000,000 yearly for subventions and payments to encourage a naval reserve would be required and would be sufficient for the United States.

Concerning the question of government ownership of shipping, the following quotation may be taken:

"Should the bulk of the shipping industry in the future devolve upon the government, then the public welfare would be greatly concerned with the relative efficiency of government steamship services; with the danger of political considerations in the employment of officials and employees, in the fixing of charges and in the selection of ports. There is, moreover, no assurance that the government steamship services would in normal times be any less costly to the government than an effective subvention program. There is much in the past experience of the United States government and of the governments of foreign countries that points to the danger of an annual deficit without the assurance of an efficient service."

"Principles of Ocean Transportation" fills the same position for ocean transportation that "Principles of Railroad Transportation," by Professors Johnson and Van Metre, fills for railroads. The subject matter includes a brief history of ships and shipping, brief references to the various kinds of ships, and descriptions of the methods of conducting freight and passenger service. Part III details the organization of the ocean carriers and the relations of the carriers with one another and the public; and Part IV relates to the government aid and regulation of ocean commerce and transportation. The book is interestingly written and after each chapter there is given a brief bibliography for the use of those who may wish to go further into the matters in question.

Letters to the Editor

Breaking in Engines

HAILEYVILLE, Okla.

TO THE EDITOR:

It is the practice of some railroads when an engine is turned out of the shop to break it in by running it out on the road fifty miles or more. This necessitates furnishing a conductor for a pilot. It seems that the engine crew alone could run the locomotive through the yard between the yard limit boards and the same purpose would be served, although some claim this is not sufficient. Some roads use an engine just out of the shops in regular drag freight service with about half tonnage over the division and as a general thing when the other terminal is reached the engine is good for service at its regular rating.

If nothing else will do than to run the engine light over the division, or a part of it, why not put on a full crew and let them unload any material there may be along the line, handle any bad order cars, or do other work of a light nature? There is nearly always some work of this sort to be done and there should be very few times when the engine would not reach the next terminal and be in condition to handle a full train on the return trip. If for any reason the engine is not able to make the next terminal and has to be returned to the shop there is very little lost, whereas by running it out fifty or sixty miles and then returning to the shop the fuel and wages of the engine crew and pilot are wholly lost. At this particular time when it is desired that every cent possible be saved it occurs to the writer that there might be a chance for economy in this direction.

J. L. Coss.

What Is Value?

ST. LOUIS, Mo.

TO THE EDITOR:

In the report of the hearings on the valuation of some railroads in Washington on December 10 to 13, 1917, Pierce Butler made the following statement, which, I think, is interesting: "Professor Adams, in a case in which we were both interested, said that it was impossible to define value, but, he said, in a rate case involving the question of confiscation, that it was an 'equitable conclusion' to be reached in a practical way so as to promote the public welfare, and he held that that 'conclusion' was the original cost of the property; for rate purposes, value would be original cost. That is to say, the concrete question put to him was this: If about the time the Indians left the vicinity of Chicago, a railroad company bought a terminal area for \$5,000 that today is worth \$5,000,000 for sale for business purposes, what would be his conclusion? And he said that his equitable conclusion was that for rate-making \$5,000 was the base; that for taxation \$5,000,000 was the base, and that if the carrier were to sell it and get \$5,000,000 and take \$4,500,000 and buy a substitute, that the \$4,500,000 would be the value of the substitute."

I mention these things to illustrate not what may happen, but what has happened when the personal conceptions as to fairness, as to right and wrong, of arbitrators or experts in particular cases are substituted for the principles which have controlled the determination of value in the courts ever since that question first arose.

C. D. PURDON,
Chairman Valuation Committee, St. Louis Southwestern.

Politeness and Intelligence Combined

SECAUCUS, N. J.

TO THE EDITOR:

Every passenger who appreciates the attentions of enlightened and truly Golden-Rule brakemen when he takes a journey in a day coach, must endorse warmly your little editorial lectures on civility. Really intelligent and efficient courtesy cannot be had without a vast amount of lecturing—by you or by somebody—and also a vast amount of teaching on the spot, and "follow-up" work. How absurd to exhort your employees, time after time, by placards displayed on the screen, by trainmaster's talks and in other ways, and yet do so little by way of inspection to see how well these supposed students assimilate the lessons so industriously poured into their ears!

As an example of what is needed in some situations I want to quote a note which I read recently in the New York Tribune. Referring to a place not far from New York City the Tribune said:

"Most of those who got off the 5 o'clock train yesterday at M—emerged from a car whose door was opened by a passenger. There was no trainman at hand, and when the trainman's attention was whispered to the fact that there was nobody to open the door, he said, 'Go ahead and report it. We can't be everywhere at once. . . .'"

That brakeman gave a reply which was all right in substance but all wrong in style. According to the letter and spirit of the instructions which I suppose are given to passenger trainmen on the best roads, this man should have said something like the following:

"I regret that you have been inconvenienced; but I have no authority to improve the situation, and if you are seriously aggrieved I shall have to refer you to the passenger traffic manager. He, no doubt, will adjust the matter to your satisfaction; at least, he has done so on all previous occasions of this kind, so far as I can recall. The trouble, you see, is that we are short handed. To this train of eight cars only two trainmen are assigned, and as one of these men must remain at the rear end to flag, or to be prepared to flag, I alone am left to attend to the vestibule doors of four or five cars. Usually I get around so as to open them all before we reach the station platform, but today I was delayed because one of the doors stuck and caused me a lot of trouble. I assure you that we are doing about as well as you have a right to expect."

Now, in all seriousness, is not that about the course of reasoning which the brakeman is expected to employ?

You suggested, sometime ago, that Harvard University ought to establish an "extension" course to educate freight conductors how to enlighten farmers on matters of public policy as related to railroads. That is very well; but why not begin on something easier?

What are our smartest trainmasters doing to make their passenger brakemen—the individual brakeman—wake up sufficiently to be really pleasing and satisfactory to every passenger he deals with, throughout one whole day?

B. G. S.

"THE FIFTH ARM."—We notice, says the London Globe, one notable omission in the scheme of the Imperial War Museum, and that is railway transport. Marshal Joffre called the present conflict "a railway war" as long ago as 1914, and when its history comes to be written, it will be found that the railway weapon has been of the most essential importance. For instance, the whole of the original German plan of campaign was based on the facilities of the Boche railway system, which again has made possible the constant "see-sawing" of large bodies of troops between the Western and Eastern fronts. "The Fifth Arm," as it has been called, certainly deserves a section to itself in any representative war museum.

The Railroad Control Bill in the Senate

Vote Expected This Week. Compensation, Rate-Making and Period of Control Debated at Length

BY A UNANIMOUS CONSENT AGREEMENT reached on Tuesday unlimited debate on the railroad control bill in the Senate will continue until Thursday, February 21, after which debate will be limited to five-minute speeches and it is expected that a vote may be reached possibly by Friday night. Administration leaders have been making every effort to expedite consideration of the bill in order to remove the uncertainty which will exist until it is passed.

Director General McAdoo has urged Congress to act as promptly as possible both for the purpose of enabling him to proceed with his plans for the railroads and also so that the financial situation may be cleared up sufficiently to pave the way for the next issue of Liberty Bonds, which has been postponed.

Senator Smith endeavored on Monday to secure a unanimous consent agreement for a vote on the bill not later than five o'clock on Thursday, but after some discussion this plan was defeated by an objection from Senator Pindexter. Senator Smith read a communication from Director General McAdoo, saying:

"May I take the liberty of expressing the hope that the Senate may soon be able to take action upon the pending railroad bill?

"I can not overemphasize the urgent necessity for prompt action in this matter. This is the time of the year when the railroads should be placing orders for essential equipment and making preparation for those improvements in their facilities which will enable them to meet the great and urgent demands for transportation for which they now not only have insufficient motive power and equipment but in many cases inadequate facilities. It is a great task to do the required work in time to get the benefits this year. It is my earnest conviction that every day's delay in setting this work forward is imperilling the success of the war, limiting the industrial efficiency and jeopardizing the general prosperity and welfare of the country. We can not go forward with many matters of vital moment until the pending railroad bill becomes a law."

A similar letter was read in the House by Chairman Sims of the House Committee on Interstate and Foreign Commerce and debate was begun in the House on Tuesday by Mr. Sims.

In announcing his intention to make an effort to secure an agreement for a time for final vote, Senator Smith objected because there had been such difficulty during the past week in keeping a quorum on the floor of the Senate, because so many senators have been attending the hearings in the investigation of the War Department. He declared that this bill is the most important measure that has been before the Senate in a generation or longer and that it is not receiving the attention that its importance entitled it to receive because senators have got into the habit of paying more attention to something that is sensational than to fundamental principle. Senator Cummins announced that he would oppose unanimous consent to fixing the time to vote on the bill until there had been a fair opportunity to debate it.

Discussion of the railroad control bill was begun in the Senate on Monday, February 11, and during the week several speeches were made on the subject by members of the Committee on Interstate Commerce, but with very little debate. The opening speech was in the nature of an explanation of the bill by Senator E. D. Smith of South Carolina,

WASHINGTON, D. C.

chairman of the committee. He was followed on February 13 by Senator Kellogg of Minnesota, who declared that in his opinion it was unnecessary to take over the railroads for government operation, but that as the railroads have been taken over the country is confronted with the necessity of making payment for the use of the property thus taken and rendering as effective as possible the operation under government control. Senator McLean of Connecticut opposed the present plan of government possession under private management as a "half-slave, half-free" policy that can be justified only at a time when the life of the nation itself is at stake," and declared that it has all the defects of government ownership and none of the benefits of private management under private ownership. He said he would vote for the bill, but that continuation of the condition would be neither justifiable or necessary at the close of the war. Senator Cummins of Iowa opposed the basis of compensation proposed in the bill as being entirely too liberal and urged that at the close of the war the roads be turned over to a board of control to be appointed by the President so that the "one-man authority" would not continue any longer than necessary. On Saturday Senator Robinson of Arkansas spoke, urging early passage of the bill. Senator Watson of Indiana delivered an address emphasizing the importance of guarding against the plan of government control being made a step toward government ownership, which he vigorously opposed and urged that a definite time limit be fixed for the termination of government control. Senator Pomerene also spoke, urging liberal treatment of the roads during the period of control.

Prompt Disposition of the Bill Urged by Senator Smith

Senator Smith urged that so far as possible all other business and subjects of debate be laid aside until a disposition is made of the bill, because of the vital necessity of stabilizing the financial situation, which is seriously affected until the status of railroad securities under the new condition is determined. The action precipitating the necessity of legislation, he said, has already been taken. The roads are in the control of the government, while the property is still in the hands of private owners and the situation creates uncertainty and doubt, which is reflecting itself in embarrassment in the financial world. He outlined the events which led up to the decision to take over the railroads, saying that the result of the efforts of the Railroads' War Board was not satisfactory, or at least did not give the relief which the circumstances imperatively demanded.

"This failure, in part at least," Senator Smith declared, "grew out of the restrictive laws in the interstate commerce act forbidding the pooling of cars and of freight. It may also be noted that the interstate commerce act gave to the shipper the right to route his freight over whatever lines he chooses. This also was an obstacle in the way of distributing freely and fairly the traffic of the country."

The proposed guarantee, he said, seemed to the committee to be a fair basis of compensation when it is considered that while all other enterprises, not being subject to federal regulation in regard to rates and charges, were the beneficiaries of the extraordinarily high prices pertaining during the war period, the railroads could not during this period increase their revenues except as they were increased by increased traffic. While there was an increase in certain rates in the eastern district, in the main the roads were

practically operating under ante-war rates and the increase was not put into operation in sufficient time to be reflected to any appreciable extent in the returns of the roads up to June 30, 1917.

The question of the real value of the property was not considered by the committee as a proper subject for the emergency legislation because the value of the properties is not now definitely ascertainable. The committee has, therefore, taken the aggregate net earnings of the properties resulting under the regulating power of Congress as a just basis on which to compute their compensation in time of the emergency.

Senator Cummins asked whether the government had taken over as a part of the railroad property the cash or non-railroad property not used in the operation of their systems. This, he said, amounted to more than \$800,000,000 for 17 roads. Senator Smith replied that neither the language of the bill, the proclamation of the President, nor the discussion during the hearings contemplated taking over such property. Senator Thomas, author of the act of August 29, 1916, under which the railroads were taken over, interjected here that he certainly had no intention of making it so operate as to invest the President with anything more than the power to control the possession of the physical property of the railroads for war purposes.

Senator Smith quoted figures showing the net operating income of the Class 1 roads, showing that for the year ending June 30, 1917, this was approximately \$36,000,000 more than in the year 1916, and \$337,000,000 more than in 1915, so that the average for the three years is \$124,000,000 less than earned during the fiscal year ending June 30, 1917. Of course, he said, it was a matter of speculation as to whether this increase would have been maintained, but it is reasonable to suppose that the roads would at least have maintained the income of 1917.

Discussing the amendment added by the Senate committee providing that there shall be no increase of compensation for any additions, improvements or betterments constructed out of or purchased by the earnings during the period of federal control, Senator Smith said this question represented one of the greatest difficulties presented to the committee. "I confess that at this stage of my investigation of this question I cannot see the difference between the money thus earned under rules and regulations that we have established and which, when earned, is being invested in further increasing the facilities of the property and money not earned but borrowed from the bank and invested in the property."

The rate-making question, Senator Smith said, gave the committee the greatest difficulty because of the two conflicting principles, one to maintain as far as possible the stability of rates, the other to grant the power to change rates to meet the changing conditions, but upon complaint the commission is still vested with the power to review the rates as heretofore and make its finding of orders as heretofore. The progressive stages of rate regulation, he said, had in the interest of rate stability gradually taken away from the carriers in practical effect the power to initiate rates except upon the prior approval of the commission. That power is now restored to the Director General, subject, however, to the review of the commission.

Senator Cummins' Address

Senator Cummins declared that the compensation proposed in the bill is from \$175,000,000 to \$200,000,000 annually more than it ought to be and that this vast sum is to be taken from the people who are already over-burdened to be given to the railway corporations "without a shadow of right, reason or justice." Also, he said, in his judgment the compensation would be nearly \$200,000,000 a year more than the roads would earn during the next few years if the

property were to remain in their possession. He said he had no objection to the act of the President in taking over the railroads because, although the railway managers under the Railroads War Board "accomplished almost a miracle in the better use and in the higher co-ordination of the transportation facilities of this country," it was not within the power of the railway companies to do the things which this country required to be done under the conditions which confronted and surrounded us. He regretted, however, that the President was not more specific and definite as to which railroads have been taken over. He thought the President should have taken over all of the railroads as a unit and if it was not necessary for him to do that, in his judgment, the President acted without authority.

In discussing the proposed compensation Senator Cummins read a letter sent out by a broker advising the purchase of railway securities and giving figures showing the percentage of earnings on the stock of various roads under the proposed guaranty, which Senator Cummins considered excessive, and he expressed the opinion that if the roads were offered "only fair and just compensation so that they must endure some of the consequences of the war," the railroads would accept it as loyal citizens convinced that a lesser compensation than the bill proposes is, under the circumstances, fair and just, and he also insisted that whether the railroads are given \$1,000,000,000 or from \$750,000,000 to \$800,000,000 annually, as he proposes, cannot in the slightest degree affect the strength of the United States in the war. The proposed basis, Senator Cummins declared, introduces into governmental railway operation "the same abominable profiteering which disfigures other fields of government activity." The amount required annually to pay interest charges, he said, was about \$400,000,000 a year and deducting this amount from the proposed guaranty would leave approximately \$550,000,000 of the guaranty available for the stockholders. He did not say that the railroads would distribute \$550,000,000 in dividends, because they have not done so in the past and he had no reason to believe they would do so in the future, but the entire sum inures to the benefit of the stockholders. This, he said, amounts to 8½ per cent on all the stock of all the railroads in America without taking into consideration the other sources of income which many of the companies have. Senator Kellogg disputed this statement, saying that according to figures he had received from the Interstate Commerce Commission the amount would be 8.26 per cent on the outstanding capital stock of \$6,314,000,000.

Senator Cummins then separated the railways into two classes, one group operating 110,000 miles of line, which he thought the bill would not guarantee more than they should receive, and another consisting of 86 systems of railway operating 140,000 miles and which carry from 75 to 80 per cent of the traffic. As to these 86 roads, he presented a table showing the percentage on the capital stock which would be guaranteed under the proposed plan. The Pennsylvania Railroad, he said, would be guaranteed 8.92 per cent, the Philadelphia & Reading 25.7 per cent, the Delaware, Lackawanna & Western 32.9 per cent, the Illinois Central 11.33 per cent, the Louisville & Nashville 16.75 per cent, the Norfolk & Western 12.51 per cent, the Atchison, Topeka & Santa Fe 9.7 per cent, Chicago & North Western 10.18 per cent, Chicago, Burlington & Quincy 22.05 per cent. For the roads in his table in the eastern district the average would be 11.48 per cent, in the southern district 12.37 per cent and in the western district 9.96 per cent. The roads in this table were those which had in the three years earned more than 5 per cent upon the capital stock. Senator Cummins proposed that any excess over the amount required to pay the usual dividend and interest on the indebtedness, should be taken by the government for use in the development and betterment of the property with the

condition that the company would never be permitted to charge the public for a return upon the value so created. He said he would offer an amendment which would not interfere with the payment of interest upon all the railway securities, including whatever dividends have been paid, whether it be 5 per cent or 8 per cent, but that if the excess were deducted the guarantee would be reduced substantially \$175,000,000 a year.

Senator Kellogg's Address

Senator Kellogg declared that this bill involves "the most far-reaching and momentous economic transition that has ever taken place in so short a time." "What effect it will have upon our industrial and political structure," he said, "no one, of course, can accurately tell, but, judging from other things and from the political experiences in our own country, it cannot be anticipated that it will meet with success."

Senator Kellogg denied that the railroads had broken down and presented statistics showing the enormous increase in traffic owing to the increase of exports on account of the European War which followed a long period of depression. It is not denied, however, he said, that there has been tremendous congestion in certain sections of the country, principally in the district east of Chicago and north of the Ohio river, but principally east of Pittsburgh and very largely on the lines of the Baltimore & Ohio, Pennsylvania and other lines in their immediate territory. One of the principal causes for the congestion, he said, was government priority orders, "a most glaring example of abuse of governmental power through separate branches of the service in no way co-ordinated."

"The result was," he said, "that thousands of freight cars were rushed to a point and tied up because materials were shipped in advance of necessity. For instance, 700 cars of material for construction of government buildings at Washington stayed upon the tracks for weeks because they could not be unloaded. Anchors were shipped under priority orders for ships not yet built and a thousand cars were tied up carrying shipyard materials. I believe it was for Hog Island, which could not be unloaded and used faster than about 15 cars a day. It shows that a transportation system run by executive orders through non-co-ordinated departments is an absolute impossibility. As a matter of fact, in spite of the Sherman law and non-pooling law and the laws authorizing a shipper to designate the route, and in spite of priority orders unwisely issued, the railroads did accomplish a great deal during the first six months of the war."

"This railway committee undoubtedly co-ordinated the facilities of various roads and enormously increased the amount of transportation. My own opinion is that it was unnecessary to take over the railroads for government operation, and that transportation, in order to be most effective, must proceed in its usual and natural channels, without too much arbitrary interference. That all that was necessary for Congress to do was to authorize the President to appoint a director or agent of the government, who should have authority to see that the railroads were operated as a unit, in order to facilitate, so far as possible, the transportation of those articles absolutely necessary to the life of the people and the prosecution of the war, and that if the transportation of any class of products or articles, such as luxuries, pianos, automobiles, and so forth, became inadvisable, this transportation could be stopped and preference given to necessities for the Army and the public. This could have been done without material injury to any of the railroads, but if they were injured by any such action a tribunal might have been created to assess the damage to be paid by the government. As a general proposition, private management is far more successful and efficient than management

through government agencies. The railroads were undoubtedly hampered by certain laws and restrictions which should have been abolished. They should have been supported by government authority to operate as a unit, to route freight over lines least congested, and to transport the largest amount of materials necessary for the maintenance of the public and of the Army. Bearing in mind that this congestion was simply in the eastern and northeastern territory, I am constrained to believe that as great service could have been obtained through the government's co-operation as by taking over the entire railroad system of the United States and operating it as a government institution. By allowing the railroads to operate their own property we would have maintained the personal interest and preserved the enterprise that goes with great organizations of this kind. One of the most valuable features of a railroad, as in all other private enterprises, is the organization and the personal interest that each employee feels, where there is an opportunity for promotion, and the highest position is within his grasp. By doing this I believe the government would have obviated a guarantee to the railroads of an income by way of compensation for the use of the properties thus taken over. But the President and his advisers thought otherwise, and I bow to that decision, and I am going to do, as is my duty, everything I can to strengthen and facilitate the government operation and to insure justice to the people and the railroads and the vast army of security holders vitally interested in this great measure."

Discussing the question of compensation, Senator Kellogg said it is not only a legal necessity for Congress to provide the means for determining and paying a just compensation, but it is of the highest importance to the country that this should be speedily determined. A further decline in railroad securities, which ought to be the best investment in the country, would threaten a public disaster.

Senator Kellogg declared that, considering the fact that 1915 was an extremely low year in net earnings and further, that there had been an investment in the property of large sums between 1914 and 1916, he was inclined to think that it was a fair offset to the very prosperous years of 1916 and 1917. While undoubtedly some roads are excessively over-capitalized, there are many that are under-capitalized and it was his judgment that it will be found, if the railroads of the country are valued, that their value is a figure not far from the present capitalization, and that 5 or 6 per cent on the actual money invested could not be called excessive.

"But if we are to concede that the earning capacity is not a reasonable basis for the value of the use of the properties, I know of no way to arrive at an accurate rental value without years of investigation and litigation. It is said that the standard return, after paying interest on the bonds of all the railroads in the country and after deducting an estimated \$70,000,000 excess-profits tax, would pay about 7.15 per cent on the net capital stock; I mean net capital stock outstanding in the hands of the public. Before deduction of this excess-profits tax it would amount to about 8.26 per cent. But this, of course, would allow nothing for betterments and improvements, which represents one of the most important questions in railroad management. Every year the railroads in this country must spend millions of dollars in betterments and improvements in order to properly serve the public. Many of these betterments and improvements are such that they will not pay a return on the investment, such as new stations, elevation of tracks, safety appliances, elevated or depressed crossings, and very many other improvements."

Senator Kellogg also took occasion to reply to statements made by Senator Cummins in his minority report, in which he had included a table of about 10 railroads which he said would be guaranteed from 21 to 647 per cent on their stock after paying interest on the bonds. Senator Kellogg

said he had submitted this table to M. O. Lorenz, statistician for the Interstate Commerce Commission, and had received from him a reply which he put into the record, showing that the Bessemer & Lake Erie, for which Senator Cummins had calculated a return of 647 per cent, owns but 8.81 miles of road, but operates 205 miles, and that while its capital stock is nominally \$500,000, the property account of the roads operated is over \$45,000,000 and the proposed standard return earned is only a little more than 10 per cent of this amount. Senator Cummins had included in his table the Chicago & Erie with a return of 70 per cent. Mr. Lorenz' letter showed that this is a subsidiary of the Erie Railroad and with only \$100,000 capital stock reports a property investment for the 250 miles of road which it owns of nearly \$30,000,000, on which the proposed standard return is less than 1 per cent. Similar statements were made for the other roads included in Senator Cummins' table. Senator Cummins took no part in the debate on this point.

"My opinion is that if the roads had been left in the hands of their owners," said Senator Kellogg, "with authority vested in the President to appoint a director who should regulate their operation during the war, with power to divert traffic to lines least congested and to co-ordinate all their facilities and equipment, the injury any road would suffer would be small and would occur in only a few instances. We would thereby have avoided consideration of this very complicated question of guaranty. As I have said, however, the President and his advisers thought otherwise, and I bow to that decision. It is our duty to determine as best we can a fair and reasonable basis of guaranty." Senator Kellogg also opposed the proposal to give the President power to initiate rates. "It is appalling," he said, "to say that because we are at war, this entire rate structure and the absolute power to change a rate affecting the billions of dollars of railroad property and hundreds of millions of dollars of commerce shall be placed in the hands of one man, without right of appeal, be he ever so great and though he possess the wisdom of Solomon. It is not the business of an executive."

Senator Kellogg also declared that the bill ought to provide a definite time after the termination of the war when government operation shall cease and that it ought not to be left to the uncertain result of future congressional action. To keep the roads an indefinite time and pay rent therefor is obtaining property under false pretenses, so far as the American people are concerned. "I am quite aware," he said, "that it will receive the approval of those who believe in government ownership and operation because they see, without squarely meeting the issue, an opportunity to get permanent possession of the railways and carry out their ideas or to experiment with the railroads with this end in view. Though I do not believe it was wise or necessary to take over the railroads, I am prepared to go to the full limit to make government operation as successful as possible and to grant all the powers necessary to that end, but I am not yet prepared to take a step that will vest such powers in government ownership advocates and force government operation of railroads upon the people of this country. That question should be met by the American people squarely and fairly, unhampered by any other issue." Considering the result of experience in government ownership and operation in other countries, Senator Kellogg said in part:

"I believe there is no question that the result of experience has shown that government operation of railways is more expensive, less efficient, and less beneficial to the people generally than private operation. We have a splendid system of railroads, with cost of construction and capitalization the lowest, in comparison, the leading countries of the world, with the best equipment, the cheapest service, and, in most respects, the best service.

"It is true that in one respect our service is not as good as that of Great Britain, Prussia, and France, and that is in the number of accidents to employees and passengers. But this is principally due to the training of the employees. In those countries, under the law, there are severe penalties accruing in the event of errors and mistakes by employees, which are enforced. There is no reason to believe that there will be fewer accidents under government operation than under private. It is impossible for me, in the time at my command, to go through all the statistics and comparisons between government and private ownership operating side by side. But experience has undoubtedly shown in Canada, France, England, Austria-Hungary, Italy, Australia, and New Zealand that government operation is less effective, less efficient, and more expensive and subject to all kinds of political interference. This is especially true in the countries where the railroad management is responsible to parliaments and congresses.

"Over and over again has it been shown where railroads are nationalized operating expenses immediately advance, the number of employees is increased, and the efficiency is decreased. Political influence is exercised over construction, betterments, and extensions to meet the demands of the people, and, with the exception of Prussia and Japan, there is not a government system in the world that pays its operating expenses and a fair rate of interest on the cost, and in many cases there are very large deficits. It is true that even the German states, outside of Prussia, do not make their railways pay, and the result in Austria has been exceedingly disappointing and disastrous.

"One of the most serious objections to government ownership and operation is the political influence and pressure brought to bear. One of the difficulties with railroads of this country has been that in many instances they have been too valuable as a political asset. But this is nothing to what it will be if the government takes over all the railroad properties, valued at more than \$17,000,000,000, and makes government employees of over 1,700,000 men.

"One of the scandals of our government occurs in connection with its appropriations for internal improvements, such as rivers and harbors, post-office buildings, drainage projects, and so forth, where Congressmen and Senators deem it perfectly legitimate to obtain any kind of an appropriation for the benefit of the people of their districts in utter disregard of whether it is necessary for the national welfare or not. If all railroads of the country were placed in the same category, improvements, extensions and betterments to meet the demands of the people of the various communities would be obtained through political influence; the running of trains, freight and passenger, furnishing facilities, would be constantly subject to political pressure through Congressmen, Senators and public men generally. It has already commenced and the people of this country are demanding that they have a right to have their Congressmen and Senators intercede with the Director General of Railroads in behalf of their particular section of the country. Their Senators and Representatives can not do otherwise than present these matters, and will not do otherwise.

"I do not say that this is objectionable other than as to the system involved. The building of railroads to meet the great commercial conditions of a growing country ought not to be constantly the subject of political pressure.

"But there is another serious objection. In turning the railroads over to government operation the employees and officers will be divested of the incentive and enterprise essential to any great undertaking. Today the highest positions with the railroads of the country are within the reach of the humblest boy in the service. I know most of the railroad presidents today controlling the destinies of this vast property and they advanced from very humble positions, and the value of the organization of the railroad company

is derived largely from motives of self-interest and individual enterprise which opportunity offers to every man in railroad employ.

"Hope of preferment and opportunity are the guiding stars which have made this country foremost in the industrial and commercial fields of the world. Nationalizing the railways makes all of the men mere government employees. There is no hope that they can reach the position of president of the railway and enjoy the power and influence which goes with that position. They are mere clerks. They lose interest and ambition. Men with capacity, ability, and authority to employ their own men could run the departments in Washington for very much less money and very much more efficiently. It is, of course, one of the things that go with a democracy. I do not wish to see it changed, except to see it bettered. I am not in favor of turning over the vast railways of this country merely to reduce men to the dependent influences of government operation."

Senator McLean's Address

Senator McLean declared that the only possible justification for the bill is the fact that it is a war measure. Regular and sufficient transportation is the great and prime necessity which cannot be met without unity of action and perfect co-operation and this cannot be had unless the power to secure it is placed beyond interference by private interests. As a war measure, therefore, he was willing to confer upon the President all the power and latitude of action necessary to enable him to make fair and reasonable agreements with the carriers for the use of their properties during the war emergency and for a period thereafter long enough to permit the carriers to readjust themselves to peace conditions. To extend the operation of the act until Congress shall otherwise order, he declared, would be to give to the law all the permanency and length of life that it is possible for Congress to give to any law and, considering the ease with which attempts to repeal it could be delayed and ultimately defeated, he could not escape the conclusion that those who vote against fixing a time within which it shall cease to operate, vote for permanent government ownership. Certainly those who favor government ownership would have every advantage, and beginning from the date of the enactment of the law they would endeavor to convince the people of the country that government regulation had failed and that the only possible solution must be found in government ownership.

"It is my guess," he said, "that a large percentage of the carriers of the country, smarting under the injustices inflicted by the system in vogue prior to December 28, 1917, will join forces with the government ownership advocates of every name and nature, including socialists and Bolsheviks, and those of us who disagree with them and want cheap, regular and safe transportation would best begin to drill for the coming onslaught."

"Putting aside for a moment the wicked things that managers of the railroads have done in the past, or would have done but for the interposition of the government, what has the capital that has been put into the railroads done for the country, and what do the railroads themselves stand for today as a national asset? The 400,000 miles of track in the United States have been put down for less than half the average cost per mile in other countries. Transportation in the United States costs less than half the average cost in other countries. The wages paid are more than double the average wage in other countries. The average tonnage per car and the total tonnage per mile is greatly in excess of that in other countries. The regularity, safety and comfort of the service provided by the American roads is far better than that of the roads in other countries. For every dollar that the railroads have taken from the public more than a dollar has been returned. Is it not time to quit

visiting upon the railroads the sins of the nineteenth century and do to them as we would be done by?

"Railway supplies and equipment—new cars, engines, and nearly everything that is required to sustain the roads and meet the increased demands upon their carrying capacity—cost nearly three times today what they did three years ago. Congress and the Interstate Commerce Commission have stubbornly refused to authorize or permit the railroads to charge self-sustaining rates, or to unify and consolidate control in the interests of economy. No business on earth could survive such treatment. The farmer who, for want of hay, put green goggles on his horse and fed him shavings was a magician in the solution of transportation problems compared with the American Congress.

"And after all, has it been the fault of Congress or the fault of a distorted public opinion which has sustained Congress in its efforts to teach the railroads to live without eating? If the American people will demand an intelligent regulation of railway rates when peace is restored, the carriers will meet every need at constantly decreasing comparative cost.

"Why should the government assume this colossal burden, a burden that will constantly increase in weight and finally result in constantly increasing cost of transportation?

"Why should we expect results very different from those which have inevitably inflicted government ownership in other countries? In the Utopia of government-owned railroads policies will be dictated by politicians. Employment will depend upon the favor of the Director General and his subordinates. Qualifications for service will depend on ability to get votes rather than ability to avoid accidents or secure regular and sufficient transportation. New lines of road will be paid for out of the annual congressional pork barrel. Rolling stock will soon compare favorably with the sorry rigs which the rural free-delivery carriers use to deliver mails. An utter lack of incentive and initiative will exist in every department. Incompetency and 'red tape' and a rapidly increasing number of employees will inevitably result. The people will not only be taxed to pay the interest on the original cost of \$20,000,000,000, but the annual deficits will constantly increase. In Italy, where the chief railways were nationalized in 1905, the number of employees increased within three years from 97,000 to 137,000, and the systems do not earn enough to pay one-quarter of the interest on the investment in them.

"It is quite probable that the managers of the great transportation lines, circumscribed and crippled as their organizations will be at the close of the war, will beg the government to buy their roads and end their sufferings. I put this question to the president of one of the leading roads of the country, and his reply was: 'As an American citizen I am very certain that a time limit should be fixed, but as a railway manager I would welcome permanent government possession and operation with a fair guaranty on the investment.' I am already receiving postal cards from railway stockholders, all printed and exactly alike in terms, urging me to oppose a time limit on the operation of the carriers by the government.

"It is claimed that, because the system in vogue prior to the 28th of December last was a failure, government ownership is the only alternative. If it is true that the system which failed was clearly unintelligent and unjust, it would seem to be clear that an intelligent regulation of the railroads of the country, under private control, should be given a trial before we adopt a system which both experience and reason tell us will result in unsafe, irregular, insufficient service, to say nothing of the opportunities for political chicanery and graft.

"I have tried to set forth some of the reasons which compel me to oppose government possession and control of the

railways 'until Congress shall otherwise order.' I hope the Senate will insist upon fixing a time limit. I hope the American people will give this subject the attention it deserves before it becomes a national issue at the polls."

Senator Pomerene's Address

Senator Pomerene declared he had no apology to make for the shortcomings of the railroads in the past, but that, in his judgment, the Congress of the United States ought not to approach this subject now as if it were going to penalize the railroads for the wrongs which they committed many, many years ago. The railroads of the country, he said, are owned by the people of the country and he quoted figures showing the number of stockholders and estimates of the number of people interested directly or indirectly in railroad securities. He also quoted figures showing the enormous shrinkage in the market quotations of railway securities amounting to 31 per cent from 1912 to 1917 and a list of stocks whose total par value is approximately 75 per cent of the total. He said that a few days ago a prominent business man had told him that he had seen the balance sheet of one of the great colleges of the country which had bought certain railroad stocks at 113, which had recently fallen to less than 60. "If we will remember this decline in market values as affecting the financial conditions of the business institutions of the country, the insurance companies, the savings banks and savings societies," he said, "we can understand what this tremendous shrinkage in values means" and he thought the time had come to give more liberal treatment to the railroads. According to the plan proposed by Senator Cummins, he said, the total of all money earned over and above dividends and interest would be passed to the government, but, in his judgment, Congress has no authority whatsoever to adopt such a course of action in fixing compensation to be paid. He also contended that there should be a definite time limit for the period of government control. If it is the judgment of the majority of the Senators and of Congress that government control should be continued or that we should have government ownership, he said, the principles of common fairness and honesty suggest that Congress shall tell the roads now what it will do, so that they may get their house in order.

Senator Robinson's Address

Senator Robinson of Arkansas also urged the Senate to give serious consideration to the bill, saying that the important questions at issue should be determined just as quickly as their importance and nature will permit. With the bill out of the way, he said, the financial plans and policies of the administration can be much more readily formulated and consummated and the enormous funds necessary to be secured through Liberty loans and otherwise for the prosecution of the war can be much more readily obtained when the questions as to the policy of the government respecting control and operation the transportation lines have been definitely fixed by law.

Senator Robinson declared that, in his opinion, federal control and operation were almost inevitable, but that the President had acted wisely in not exercising his powers until the necessity for such action had been recognized by public opinion. In explaining the reasons for his belief that government control was necessary, he pointed out that in recent years railroad extensions and construction have not kept pace with the requirements of commerce. He said it would not be profitable to enter upon a discussion of the reasons, but the railroads were unable to increase their facilities to correspond with the increased traffic and the military operations of the government were being greatly embarrassed. The railroads were restricted by the laws and while the service which the War Board rendered was in many respects admirable and highly commendable, it could not make or

repeal laws and, most important of all, it could not remove the natural obstacles to unified operation created by the desire and obligation of every railroad manager to secure for his line all the business he could obtain.

Furthermore, he said, the railroad representatives were fearful of a decline in railroad credit. They claimed to need the financial support of the government to strengthen and stabilize railroad securities, in the absence of which the railroads were threatened with ruin. Whatever may be our views concerning the wisdom and necessity of federal control, he said, it is an accomplished fact and the taking possession of the roads creates a legal liability on the part of the government to the owners to pay for the use of the property taken. He then entered upon a lengthy discussion of the proposed basis of compensation to show that the provision in the bill is fair and just and approximates the basis upon which the courts would determine it. No other plan has been suggested, he said, which, in his opinion, so nearly meets the requirement of fairness and justice to both the public and the carriers as the proposed standard return and if the roads had continued under private control it is quite probable that the amount which the public would have been required to pay for transportation would have exceeded the amount that will be paid to the railroads under federal control. He discussed at length the British plan of control of the railroads. Senator Robinson concluded as follows:

"The railroads of the country are a material and necessary factor in the successful prosecution of this war on the part of the United States. We must operate them during the war under unified control; we must speedily hasten to France the troops and supplies which are necessary to enable us successfully to maintain this combat. This measure is a part of the administration war programme. It has been found necessary in the public interest, and the administration and the public await with anxiety the final disposition of this bill."

Senator Watson's Address

Senator Watson particularly opposed the idea of an indefinite period of control.

"From the financial standpoint," he said, "this is the most colossal proposition ever presented to any legislative body in the history of the world. It involves taking this vast property from the hands of those who made it and those who own it, and committing it to the operation and control of the government. It involves transferring the authority to make rates from the legislative to the executive branch of the government. And, if the time limit set forth in the last section be stricken out, it may prove to be the first step in the government ownership of all the transportation facilities and all the methods of communication of the entire land.

"I do not believe that the railroads of this country will ever be permitted to return to the old competitive system which we have compelled them to pursue for the last 30 years. I believe that they will be nationalized; that they will be operated as one transportation system; that they will be permitted to pool their traffic and their earnings; that useless lines will be abandoned; that all the property and all the equipment which every railroad has heretofore provided for its own operation and its own use will be used in common by all the other railroads in the nationalized system. I believe that the government will control and finance this unit, and that private ownership will be continued in the future as in the past. In short, complete governmental control with private ownership of the property controlled.

"Suffice it in this place to say that the tremendous success achieved by the Railroads' War Board in the nine months of its control is a most forceful illustration of what can be done under a unified railroad system properly managed. It

may safely be predicted that the American railroads will never return to the old system of competition. I believe that it is gone forever; that the Sherman anti-trust law so far as it affects railroad combinations will be repealed; that anti-pooling laws directed at railroad operations will, in so far as they affect the transportation system of the country, be abrogated, and a plan will be adopted which will give the government practical control of American railroads, without the weakness and the inefficiency incident to government ownership."

In discussing section 1 of the bill, which provides for compensation to the railroads for their use while under government control, Senator Watson said in part:

"It is better for us under existing circumstances to deal generously with the roads than to have eighteen billions of properties plunged into litigation with all that such litigation would mean to the country at the present time."

In discussing the rate-making power, Senator Watson said in part:

"This bill is a war measure. It deals with an unusual situation and therefore confers unusual power. The President by the provisions of this act is authorized to guarantee the roads a fixed dividend to insure the maintenance of every railway system at its present efficiency and to finance improvements and additions.

"It may be necessary, therefore, successfully to carry out this vast project, for the President to raise the rates and he should be given power to assume the initiative in this undertaking. It follows that their control and operation should be placed in the hands of the executive department of the government. While in time of peace the authority to make rates may remain lodged in the legislative branch of the government, yet, in order properly to finance the operations of all the railroads, it seems to me there is no escape from the conclusion that it must be done by the executive branch of the government alone.

Government Ownership

"But, Senators, government control is not government ownership, although the two are frequently confounded in the public mind; and, although they are used interchangeably by many bodies in drafting resolutions, in reality they are as wide apart as the poles.

"Government control means the adoption of a plan that would enable the government to have charge of the operations and the financing of all the roads without being compelled to buy them. Government ownership would necessitate the purchase of all the property valued at approximately eighteen and one-half billions of dollars. It would at once deprive the states of something more than a hundred and fifty millions by way of taxation. In Indiana the railroads paid in 1917, \$5,888,000 in taxes, state and local, on a valuation for taxation of \$240,000,000, or approximately 11.6 per cent of the total assessed valuation on the property in the state for taxation. The elimination of this great sum would seriously cripple other forms of industries that would be compelled to bear this increased burden of taxation under government ownership. Proper governmental control would not involve this relinquishment.

"If the government owned the railroads they would be directly administered by the President and his Cabinet. But I believe it to be far preferable that some plan should be devised that would mean advisory control, exercised very much as England is handling its railroads today.

"Governmental control will undoubtedly enable the railroads of the country to handle all the traffic in any time of peace and practically all of it in this time of war. It is not necessary that a policy of government ownership should be adopted in order to secure this desired end.

"My objection to returning wholly to private management is that in the time of peace the railroads might not be oper-

ated as they were under the Railroads' War Board; that the old competitive methods might be readopted, and that all the old systems with all of their evils might again be foisted upon the public. Therefore, I favor such public control as will preserve the good and prevent the evil of private management, and at the same time avoid the dangers and pitfalls of government ownership.

"Government ownership of railroads would undoubtedly be immediately followed by the government ownership of the telegraph and telephone systems and express companies. We have already gone to great lengths in experiments with government ownership. We have a government owned railroad in Alaska; we have a government owned nitrate plant; we have a government owned armor-plate plant; we are erecting two government owned ammunition plants, and, in my judgment, without any authority of law; we have a government owned merchant marine, and we are so far committed to that policy that it is time for us to pause long enough to see whether we are drifting as a nation.

"I believe that the government ownership of all the methods of transportation and all the means of communication, adding four millions of people to the pay roll and converting them into federal employees, will ultimately result in the destruction of our form of government. Undoubtedly it means a letting down in efficiency, it means a lowering of all the standards of effectual workmanship, and it means a vastly increased outlay of money for a vastly inferior service. Everyone who is familiar with the operations of the government knows these things to be true.

"I am opposed to indefinite extension of government control because it opens up the way for, if indeed, it is not intended as the first step toward government ownership. Certainly it is in complete harmony with the purpose of all socialists, national and international—the force that is asserting itself so tremendously in all nations at the present time.

"This means other millions working for the government. It means the extension of civil service over this vast number of citizens; it means that the civil service system, regardless of its merits in the past and of the high purpose of those who conceived and those who have since enforced it, is quite likely to break down, because of the power it will be required to exercise. It means the inescapable temptation to use this force as a political machine to raise the wages of all employees before election, and to use all the other means of control and methods of subordination known to the American people and sometimes used by politicians in the stress of a campaign.

"I do not believe we can stand that strain. I do not believe we should place such dangerous power in the hands of any man. I do not believe that we should confer such extreme authority over such a vast number of American citizens upon any individual. It is contrary to the very purpose of our theory of government.

"If we take the first step along this socialist highway, who so wise as to prophesy what the last may be? Who so bold as to deny what the next will be? Unquestionably, we are face to face with the settlement of this stupendous problem, and we should not commit ourselves even to the first of its doctrines without preparing to accept them all or to fight them all. For, if we inaugurate this programme, in the end it will all be forced upon the country, and, in my judgment, forced upon it to the destruction of our form of government.

If we have in this country the government ownership of railroads, telegraphs, telephones, and express companies, immediately the demand will come to take over the mines. In fact, we are told that the administration is even now preparing to take charge of the mines and of the oil fields. This may now be, or may hereafter become necessary, as a war measure. But if the control of all these public utilities

shall continue in the time of peace, as it is now proposed that the authority invested by this bill shall, there is the gravest danger that any President, backed by the power his position naturally gives him over the press and over the people; that any President, backed by all the tremendous agencies he can use for the formation of public opinion and the vast influences he can bring to bear for the creation of public sentiment; might make himself the Chief Executive of this country so long as he chooses to do so, and that would ultimately mean the overthrow of the form of government created by the fathers and preserved to us by the countless sacrifices of succeeding generations.

"I am decidedly in favor of the time limit imposed in this bill. There is no occasion for further extending it. The Congress in existence at the close of this war will meet the exigencies of the occasion. The American people will demand that this question be dealt with wisely and patriotically and bravely, and the American Congress will heed that demand.

"I early offered an amendment providing for a six months' limitation on governmental control after the proclamation of peace. The committee has seen fit to extend the limit and while I very much prefer the shorter period yet I am content to see the latter imposed.

"All the other authority conferred upon the President is for the period of the war. This, too, is a war measure. There is no possible justification for it on any other theory. The President's proclamation recites that this step is taken because of the compulsion of war; he sets forth specifically that he took this action under the statute of August 29, 1916, which is nothing but a war enactment and wholly for war purposes; this very bill recites that this legislation is rendered necessary as a war proposition.

"Why, then, should not the powers it bestows, cease at a specified time after the war? On what theory can it be definitely extended? Who is willing to contend that it is necessary, in order to win this war, to permit Mr. McAdoo, or any other man, to control the railroads long after the war shall have ceased?"

Senator Johnson's Address

Permanent government ownership of railroads, rather than government control for the period of the war, was advocated by Senator Johnson of California.

"I would now take the inevitable next step in government control of our railroads," Senator Johnson declared, "and do whatever might be essential to make that government control permanent government ownership, or at least leave the way open so that immediately upon the determination of the war, we might follow to its logical conclusion what already we have partly done."

The California Senator protested vigorously against the proposed rate of compensation to be paid the railroads under the provision of the bill, and also opposed the Senate's plan to turn the roads back to private management 18 months after the conclusion of peace.

In support of his declaration for government ownership Senator Johnson said that the railroads had broken down under the stress of the last few months; that, if the country is to have efficient national transportation, the roads must be nationalized and operated by one directing head; that the American people have "paid the price of private ownership" and that "despite barriers or obstacles, the nation is marching straight to the goal of public ownership and the people at last will come into their own."

Senator Robinson of Arkansas has submitted some amendments to the bill for the purpose of clarifying certain language in it and to omit the provision for paying compensation for the new investment from June 30 to December 31, 1917, Senator Townsend has submitted in the form of an amendment a substitute for the bill, prepared outside

of the committee, but he said not particularly with the idea of securing its adoption.

A minority report was filed on February 15 by eight Republican members of the House committee, declaring their intention of supporting the bill, but that it should be amended to provide that the rate-making power of the Interstate Commerce Commission shall remain unimpaired and that a definite date for the determination of federal control should not be more than one year after the proclamation of peace. The report is signed by Representatives Esch, Hamilton, Parker, Winslow, Dillon, Sweet, Stiness and Cooper.

Various amendments to the bill have been submitted by Senators McLean, Saulsbury and Thompson, the latter providing for a continuation of government control until Congress orders otherwise.

Members of Congress are receiving numerous telegrams from chambers of commerce and other similar organizations in the interest of various short line railroads which they do not want to have left out of the list of roads taken over by the government. Many other telegrams and resolutions are being sent in by shippers' organizations protesting against any disturbance of the rate-making powers of the Interstate Commerce Commission.

The Nebraska State Railway Commission has sent the following:

"We protest proposed basis of compensation to railroads under government operation as excessive. Railway operating income plus income from other sources gives percentage returns on capitalization of three principal roads in this state as follows: North Western, 12.04; Union Pacific, 14.14; Burlington, 25.63. Suggest limitation to regular dividends of last three years. By all means, strike words 'reasonable compensation' from first section of bill. They surrender all that has been gained in rate regulation. We also protest giving the President power to initiate or make rates; should be left where it now is."

Representatives of the railroad brotherhoods and other labor organizations have addressed a petition to both houses of Congress asking them not to fix a time limit for the return of the railroads to their owners, leaving the question for further determination.

FILMS TO BOOM BRITISH TRADE.—Latest advices from London say that a scheme has been formulated by British Industries, Limited, for furthering British trade in foreign markets by means of the films. The company is arranging a tour which will begin next June, or as soon thereafter as international affairs permit, and will embrace the principal cities in western Europe, North and South America, Canada, India, South Africa, Egypt, Australia and New Zealand. In 85 of the principal cities of the world films are to be exhibited illustrating leading British industries and manufactures, and to these exhibitions representatives of the principal firms in the cities visited will be invited. A British manufacturer may have films of his industry prepared by the company, and these will be exhibited in such places included in the tour as he may select.

A commercial reference book entitled "British Industrial Expansion," is also to be prepared for distribution during the tour, and in this each exhibitor will be entitled to two pages of descriptive matter in one or more of four languages. In addition to the film of any particular industry, there will be supplementary and descriptive slides giving the names, address and business of the different firms. The tour is estimated to last 18 months.

MAIL BY AIR IN SWEDEN.—The Swedish Government is considering proposals for the establishment of an airplane postal service between Noortelje and Abo, beginning during the latter part of February or the early part of March.

A Scientific Study of Railway Track Under Load

Progress Report on Investigations and Extensive Tests Extending Over Five Years

After five years of investigation a special joint committee of the American Society of Civil Engineers and the American Railway Engineering Association, organized to investigate the stresses in railroad tracks, has presented a report which has been published in the proceedings of the American Society of Civil Engineers for January, 1918. The report covers nearly 200 pages, and the large amount of work done by the committee is indicated by the statement that the tests involved 250,000 observations in rail strains alone. Although the committee calls attention to the fact that the investigations are to be continued, much progress has been made in ascertaining the action of track under wheel loads and the report affords a fund of knowledge on a subject concerning which very little tangible information had been available previously. An abstract of this report follows:

Fundamental Considerations

A proper conception of the fundamentals underlying the action of track under load may be had only by considering the track as an elastic structure under load: The wheel loads are applied on the top of the rails; the rails act as flexible beams which rest on flexible supports (ties); and the ballast and roadway on which the ties rest are themselves yielding or flexible. Due to the stiffness of the rail and the yielding of its supports, the load from a wheel will be distributed over a number of ties. It is evident that the amount of yielding of the supports affects the values of the moments and stresses developed in the rail. The properties of elasticity and stiffness in the rail, the tie, the ballast, and the roadway enter in a complex manner into the development of the stresses in the track structure, the relative stiffness of the various parts affecting the results in any one part. The spacing of the wheels of locomotives and cars longitudinally along the track also influences the division of the load, as pressures on the various ties, and hence influences the value of the stresses developed in rails, ties and ballast.

A number of writers have obtained expressions for the bending moment and stresses in a rail by considering the latter as a simple beam supported on the two adjacent ties, with the wheel load at a point half way between. Other writers assume the beam to be fully restrained over the adjacent ties. In these and many other ideas it is virtually assumed that the load is taken only by the two ties adjacent to the load.

If we consider a rail with an indefinitely large number of evenly spaced wheel loads, the tie spacing being, say, not more than one-third of the wheel spacing, it can be shown mathematically that, for a given wheel spacing, there is relatively little difference in the tie reactions until the wheel spacing becomes quite large. The foregoing refers only to an indefinitely large number of wheel loads. For a small number the results will be greatly modified.

Analysis of Track Action

It is concluded that the method of analysis which is based on the assumption of a continuous elastic support under the rail is by far the most convenient, most easily applied, and most comprehensive in its application to the questions involved in the work. The assumption of a continuous support in place of tie supports is not an element of serious inaccuracy for the close tie spacing and large rail sections

used on American railroads. The method has been found to be more general and to have fewer limitations than the methods based on concentrated tie loads.

The term, modulus of elasticity of rail-support, is introduced as a measure of the vertical stiffness of the rail-support. It may be defined as the pressure per unit of length of each rail required to depress the track one unit. It represents the stiffness and yieldability of tie, ballast, and roadway, but does not involve the stiffness of the rail. As applied to ordinary track, the load on one rail required to

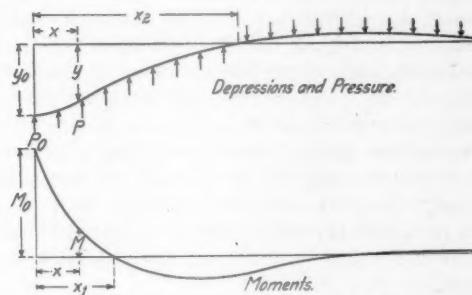


Fig. 1. Distribution of Depression and Bending Moment for a Single Load

depress one tie one unit, divided by the tie spacing, will give the modulus of elasticity of rail-support.

The method of analysis will be developed, first for a single wheel load and then for a combination of wheel loads. Assume that the rail is supported continuously on an elastic support and that the support has a constant modulus of stiffness; that is, that the depression of the track and the resulting upward pressures on the rail are directly proportional to each other. Assume, further, that the track construction is such that negative pressures may be developed. The following nomenclature will be used (see Fig. 1):

P = wheel load on a rail at the point which will be used as the origin of abscissas;
 E = modulus of elasticity of steel;
 I = moment of inertia of section of the rail;
 y = depression of rail at any point, x , it being assumed that there is no play or back-lash in the track; downward displacement of a rail is negative; however, in the applications to track, the ordinary downward depressions of track will be spoken of as positive;
 p = upward pressure against rail per unit of length of rail at any given point;
 u = an elastic constant which denotes the pressure per unit of length of each rail necessary to depress the track (rail, tie, ballast, and roadway) one unit; for the system of units ordinarily used, it will be expressed in pounds per inch of length of rail required to depress the track 1 in.; u represents the stiffness of the track, and involves conditions of tie, ballast and roadway; it is termed the modulus of elasticity of rail-support;
 M = bending moment in rail at any point.

The fundamental condition on which the analysis is based is that the track depression at any point and the upward pressure on the rail per unit of length at the same point are directly proportional to each other. In other words, $p = uy$.

It will be recalled that, in the mechanics of beams, the derivatives of the elastic curve (first, second, third, and fourth), in their order, represent or are proportional to (1) the slope of the elastic curve, (2) the bending moment in the beam, (3) the shear, and (4) the intensity of the load. In the case in hand, the fourth derivative (the intensity of the load) has the unique relation of being directly propor-

tional to the original function, given by the equation of the elastic curve or curve of depression of track.

From the fundamental condition, the differential equation of equilibrium is

$$EI \frac{d^4 y}{dx^4} = u y \dots \dots \dots (1)$$

This differential equation is satisfied by the following equation:

$$y = -\frac{P}{4EIu^3} e^{-x} \left(\sqrt{\frac{u}{4EI}} \cos x + \sqrt{\frac{u}{4EI}} \sin x \right) \sqrt{\frac{u}{4EI}} \dots \dots \dots (2)$$

From this, formulae may be obtained for the bending moment in the rail, the shear and the intensity of the pressure (p) against the rail, and with the aid of these the characteristics of the curves for bending moment and rail depression shown in Fig. 1 may be determined for any set of values assigned. To find the effect of a combination of wheel loads on the track depressions and the pressures and the bending moment in the rail, as may occur with a given type of locomotive, the equations and diagrams for a single wheel load may be applied by the use of the principle of superposition; i. e., by considering that, at a given point along the rail, the combined effect of two or more wheel loads is the algebraic sum of the effects of the individual wheel loads.

Special Apparatus Used

Nearly all instruments used in the tests were designed especially for the work. In the tests with static loading, longitudinal strains in the rails under bending load were measured with a Berry strain gage. A level-bar was used to measure the deflection of the rail and the depression and bending of the ties. For measuring the pressure transmitted to various parts of the ballast a pressure-capsule was used in which the elastic deflection of a thin steel diaphragm is transmitted to an indicating dial micrometer.

A flat car loaded with from 25 to 50 tons of rails was used in connection with special load-indicating screw-jacks to apply loads equivalent to a one-axle or a two-axle load. The rails on the car were supported on H-beams placed crosswise of the car, and the bottoms of these H-beams rested on the upper ends of indicating screw-jacks. The lower ends of the screw-jacks bore against the rails through curved bearing blocks having a radius approximating that of an ordinary car wheel, but not coned. The construction of the load-indicating screw-jacks is shown in detail in Fig. 2. To measure the strains in rails under moving locomotive loads an instrument involving the general principle utilized in the stremmatograph developed by Dr. P. H. Dudley was devised. In moving-load tests, the deflection of various points of the rail was measured by using double-exposure photograph of small pieces of black paper with small white crosses on them that were glued to the rail at intervals along the outside.

The Test Track

The track of the Illinois Central used in the test work is on the double-track main line, about two miles north of Champaign, Ill. The stretch of track used is on an embankment, from 4 to 8 ft. high, composed of loam and clay. A single-track road was built in 1854, and the second track was added in 1900. Age has given compactness to the embankment, and it was in dry condition throughout the tests. The ballast at this place consists of crushed limestone; it usually has an average depth under the ties of about 12 in. The rails are A. S. C. E. 85-lb. section. The rails on the south-bound track are 33 ft. long, and were

laid in 1902; those on the north-bound track are 30 ft. long, and were laid in 1900.

To provide uniform known conditions of track for the tests, four stretches were specially prepared. For these test sections special oak ties replaced the original ties. Four such sections were prepared within a short distance of each other. On one section the ballast had a depth of 6 in. below the ties; on another, 24 in.; and on two others, 12 in. On one of the last-named sections the ties were 7 in. by 9 in. by 8 ft.; on all others they were 6 in. by 8 in. by 8 ft. In locating the test sections, depths of ballast closely approximating those desired were found, and the track was raised to make the proper depth. The special ties had been prepared accurately to size, and were of uniform quality. When first prepared, these special test sections were laid

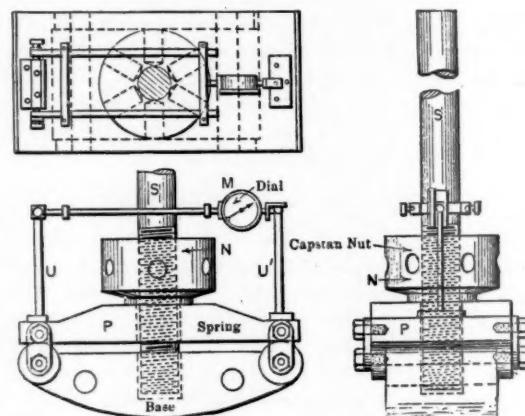


Fig. 2. Details of Load-Indicating Jack

with the 85-lb. rail which had been in the track originally. Later, when it was desired to use heavier rails in the tests, these were removed and replaced by the heavier ones. The sections used were chosen because they were readily available, and give considerable range in weight.

In placing the ties used for the special test sections, the old ties were removed and the new ones put in without disturbing the ballast below the bottoms of the ties. This was done by the regular section men of the Illinois Central. For each test section, the depth of ballast was determined by excavating to sub-grade, near the ends of the ties on each side of the track at two points in each rail length. The track was raised sufficiently to give the required depth of ballast under the ties, and in no case was it necessary to raise the track more than two inches. Whenever the track had been in use long enough to need it, it was tamped and put in good surface. After such resurfacing, tests were not run until sufficient time had elapsed for traffic to compact the ballast which had been disturbed; generally 10 days or 2 weeks were allowed.

Static-Load Tests

The typical procedure of the static-load tests, when the loading apparatus for one-axle and two-axle load was used, was as follows: The car, loaded with rails, was taken to the test section and carefully spotted over the points where the load was to be applied. The brakes of the car were then set and the engine was uncoupled and run away from the test section far enough not to affect the results. After the load-indicating jacks had been put in place, ready to apply the load, zero-load readings were taken with the strain-gage and the level-bars. Load was then applied with the jacks, and a set of load readings were taken. The next load increment was applied and the load readings taken. After the desired number of increments of load had been applied (usually four), the load was removed and the zero-load

readings were again taken. To take a complete set of readings, including two sets of zero readings and four load readings, required from $1\frac{1}{2}$ to 2 hours.

The typical procedure in static-load tests with a locomotive was practically the same as when the loading apparatus was used. The locomotive was then run on the test section and spotted at the desired point. Load readings were taken, and then the locomotive was spotted at a new position and load readings taken. After taking load readings with the locomotive at the number of points desired, the locomotive was run off the test section and zero-load readings were again taken.

Moving-Load Tests

Tests in which the load on the test track was produced by a locomotive running over the section are designated as moving-load tests. On the tests on the Illinois Central three types of locomotives were used in moving-load tests, a Mikado, an Atlantic, and a Pacific. The same types were used on static-load as on moving-load tests, except that the

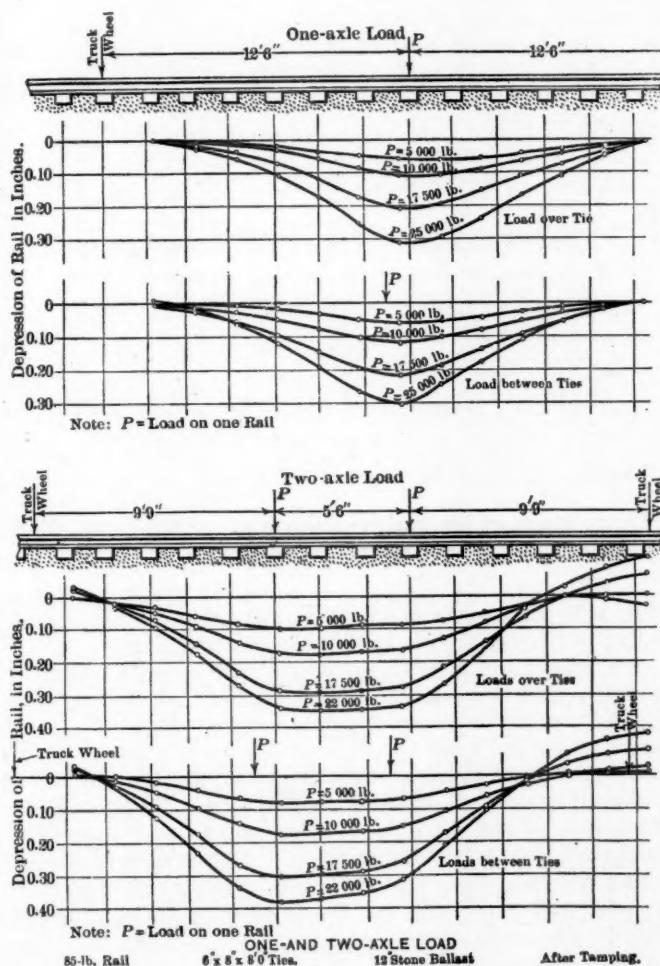


Fig. 3. Track Depression Profiles

switching locomotive was used only on static-load tests and the Pacific locomotive only on moving-load tests. The Mikado locomotives were used at speeds up to 35 m. p. h., that being the maximum speed permitted by the regulations of the Illinois Central. The Atlantic and Pacific locomotives were used at speeds up to 60 m. p. h., a few tests being made at higher speeds.

In all moving-load tests (except at very low speeds), steam was shut off as the locomotive approached the test section of the track. It was found that the tractive effort

of the locomotive produced an appreciable effect on the rail stresses which was somewhat variable, and it was decided to eliminate this variable at first and to study only the effect of speed, leaving the effect of traffic for investigation later. In order to have the counterweight of the locomotive drivers in the same position in all tests, the drivers were slipped to cause the counterweight to come to a definite position for a given position of the locomotive on the test section.

Tests were also made on the tracks of the Delaware, Lackawanna & Western at a point near Dover, N. J., during the fall of 1916. The section of track chosen was on the east-bound main line, about one mile east of the station at Dover. The tracks here are laid with 101-lb. D. L. & W. rails on 7-in. by 9-in. by 8 ft. 6-in. creosoted pine ties, tie-plates and screw-spikes being used on every tie.

The ballast consists of trap rock having a depth of about 18 in. under the ties. Directly beneath the ballast there are 2 ft. of cinders, which were originally used as a ballast. Beneath the cinders is a light embankment of clay mixed with boulders. For purposes of the tests, the original rail at this point was replaced by new 105-lb., D. L. & W. rail section for about $\frac{1}{4}$ mile. This change was made and the track was put in good line and surface about September 1, a month before the tests were started. Tests were made with a Ten-wheel, a Mikado, and two Pacific locomotives. The method of making the tests was the same as that followed on the Illinois Central.

Depression of Track

In Fig. 3 are given track depression profiles for one-axle and two-axle loads (the axles being 66 in. apart), for tests made on the test sections of track on the Illinois Central. At the place where the tests with loading apparatus were made, the ties were 22 in. from center to center. The load was applied near the middle of the length of a rail, in order to avoid the effect of rail joints.

Little difference is to be found in the depression for the load over a tie and for the load midway between ties. The depression is generally somewhat greater for the load over a tie. This is true of both one-axle and two-axle loads. There is a marked difference in the magnitude of the track depression according to the condition of the track, freshly tamped track having a smaller depression under load than track which has been subjected to the action of traffic for a considerable time after being surfaced. In this report the term "after tamping" is applied to track on which trains had been run for, say, from one to two weeks after the track had been tamped. The term "before tamping" is applied to track which had been subjected to traffic of passenger trains for, say, from two to six months. It should be stated, however, that in all these tests the track was in excellent condition.

For freshly tamped track the magnitude of the depression of the track is directly proportional to the load applied. This property of direct proportionality in track depressions corresponds to a constant modulus of elasticity of rail-support. It will be found that the relation between the magnitude of the applied load and the magnitude of the track depression (corresponding to the quality of stiffness in properties of materials), is an important property of track, and has an influential bearing on the stresses developed in the rail under applied load.

In tests of track before tamping a light load produced a relatively greater depression than was given by later increments of load. It thus appears that the stiffness of the rail-support is smaller for the lighter loads. This may be thought to be in the nature of play or looseness in the track. It is probably nearer correct to say that for the smaller loads the depression produced is not proportional to the load applied. If there is play in the test sections of track, it would seem

most likely to be between the tie and the ballast immediately under the rail and adjacent thereto, so that the tie must bend before it comes to a full and even bearing along its length, and part of the resistance for the lighter loads may be that of the flexural resistance of the tie.

Stresses in Rail; One-axle Load and Two-axle Load

Fig. 4 gives load-stress diagrams for gage lines at the point of application of load in the case of one-axle load and at the points of load in the case of two-axle loads, the average of the stresses at the two points being taken in the latter case. Little difference is to be found in the rail stress under the load for a load over a tie and for a load midway between ties. The stress is generally somewhat greater for the load between ties, though the difference is smaller than the variations found in different tests.

It is seen that the rail stresses differ markedly according to the condition of the track, freshly tamped track giving smaller stresses than track which has been subjected to the action of traffic for a considerable time after receiving a general surfacing. This is found to be true in tests for both the one-axle and the two-axle loads. In general, for freshly tamped track the stress developed in the rail is di-

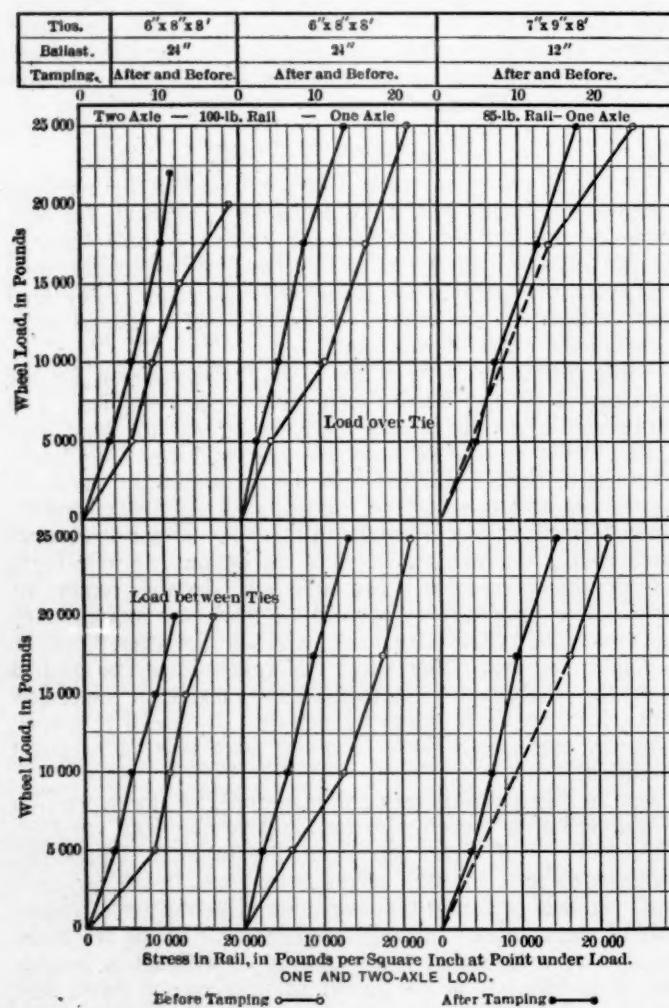


Fig. 4. Load Stress Diagrams

rectly proportional to the load applied. For the track "before tamping," the stresses appear to increase proportionately to the load; but, to the stress found on this assumption must be added a constant stress in order to obtain the stress which is developed at the given load. It would appear, also, that the rate of increase of stress with increase of load is approximately the same in track "before tamping" as in freshly tamped track, the lines in the load-stress

diagrams being approximately parallel for the two cases. For a rail of 85-lb. section the stress in rail in an untamped track was found to be as much as 6,000 lb. per sq. in. more than in freshly tamped track, and this was true whether the load was 10,000 or 50,000 lb. per axle, or whether the stress for the freshly tamped track was 5,000 or 20,000 lb. per sq. in. Tests have not yet been made to determine what the effect would be on track in poor condition.

Stresses in Rail; Static-Load Tests with Mikado Locomotive

In Fig. 5 are given stress-distribution profiles for static-load tests with the Mikado locomotive on rail of 85-lb. and 100-lb. sections on the test sections of track on the Illinois Central. For the 85-lb. section, tests were made on three depths of ballast and two sizes of ties; for the 100-lb. sec-

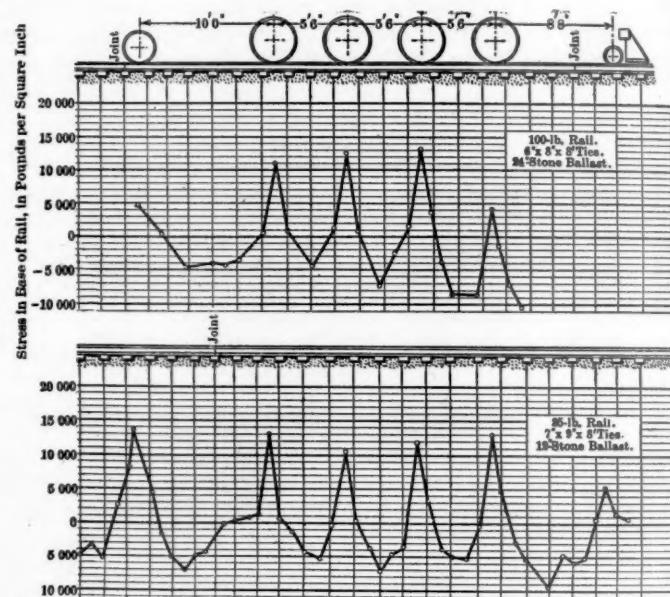


Fig. 5. Stress Distribution Diagrams. Static-Load Tests with Mikado Locomotive

tion, tests were made on one depth of ballast. In all these tests the track was in a freshly tamped condition.

The maximum stresses in the rail are directly under the wheels, positive moment being developed at these points. Negative moments occur at points between the wheels. The stress under the inner two drivers is generally less than that under the outer drivers, and that under the front driver is generally somewhat greater than that under the rear driver. The tests on rail of 100-lb. section gave lower stresses, as might be expected, but the general distribution of stresses along the rail was much the same. The effect of the increased section of rail on the bending moment developed will be discussed later.

Modulus of Elasticity of Rail Support

The table gives the values of the modulus of elasticity of the support as calculated from the track depressions expressed in pounds per inch of rail length to depress the track one inch. The conditions of track are not stated very definitely, but even in track marked "before tamping," the track was in good surface, and only in a few instances was it in need of tamping. The values derived from the tests for the different methods of loading on the same track agree very well. There seems to be some tendency toward a higher value of the modulus in the track having the heaviest rail. It is apparent that the character and condition of the track greatly influence the magnitude of the modulus of elasticity of rail-support. The value for the

modulus on the track of the Illinois Central with 24-in. ballast may be taken as about 1,600 lb. per in. per in. For the track on 6-in. and 12-in. ballast, the values are approximately 1,000, except for the track on 7-in. by 9-in. ties, where the values are higher, say, about 1,200. Although the embankment for the two tracks was built at different times, it is not known that the two parts of the embankment have any special differences in condition. In all these test stretches, there is a tie spacing of 22 in. where the tests were made. For track used for freight service, which was ballasted with 6 in. of cinders in not very compact condition, the value of the modulus of elasticity of rail-support is about 750. For the track of the Champaign and Havana branch of the Illinois Central with about 6 in. of fine cinder ballast above a light embankment of loam, tie spacing varying from 22 to 26 in. (56-lb. rail), the modulus of elasticity of rail-support found was about 530. At the time, the track was not in good condition at the point where the test was made. Some of the ties were partly decayed.

For the track of the Delaware, Lackawanna & Western information on the depression of track and the condition of the track is not complete, and only an estimated value of the modulus of elasticity of rail-support can be given. This

from the smaller value of this stress and the greater variations of conditions to which it is subjected.

Influence of Rail Section

The heavier rail gives a much higher bending moment coefficient than the lighter. It will be most convenient to use in the discussion the bending moment coefficient, K , by which the wheel load, P , may be multiplied to get the bending moment at the load or at a point between loads. If the difference in the track conditions is taken into account, the 125-lb. rail being on track with 24-in. ballast, which gave a higher modulus of elasticity of rail-support than that of the track on which the tests of 85-lb. rail here used were made, the contract becomes greater. That the bending moment coefficients should be greater for the heavier sections is evident from analytical considerations, especially in the case of the trailer, which is at some distance from other wheels, and in the case of outer drivers. The increase due to increase of section, however, is greater than may be expected from the analysis of track action herein given, or for any known rational analysis. For the drivers and trailer of the three types of locomotive used on the Illinois Central, the values of the bending moment coefficient derived by the

VALUES OF MODULUS OF ELASTICITY OF RAIL-SUPPORT

Depth of ballast, in inches	Size of ties, in inches	Condition of tamping	85-lb. Rail			100-lb. Rail			125-lb. Rail	
			Loco-motive	One-Axle	Two-Axle	Loco-motive	One-Axle	Two-Axle	Loco-motive	One-Axle
24	6 by 8	Before	....	1,170	1,180	....	....	1,090	....	1,640*
			....	1,190	....	....	1,080	1,100	....	1,820*
			....	1,640	....	....	1,030	....	....	1,600
			....	....	....	....	880	....	....	....
		
		Average	....	1,330	1,180	....	1,000	1,090	....	1,690
24	6 by 8	After	1,650	....	....	1,510	1,710	....	1,540	1,920
			1,660	....	....	....	1,430	....	1,420	1,840
			1,570	....	....	....	....	....	1,800	1,560
			....	....	....	....	....	....	1,830	2,010
			....	....	....	....	....	....	1,380	....
		Average	1,630	....	....	1,510	1,570	....	1,590	1,830

track was evidently stiffer than that of the Illinois Central. The value, 2,200 lb. per in. per in., is probably representative of this track. The track had 18 in. of trap rock ballast below the tie, and the material of the roadway below was such that it was very solid. The spacing of the 7-in. by 9-in. by 8 ft. 6-in. ties averaged about 22 in.

Effect of Increased Speed

From tables arranged to show the effect of speed as a percentage of the stress in the rail at 5 miles per hour for each mile per hour increase of speed greater than 5 miles per hour, it is found that the values for the increase for positive moment range from about 0.3 to 1.2 per cent increase for each mile per hour increase in speed. Values higher than 0.9 per cent are found in a number of cases. The increases found in the tests on the Delaware, Lackawanna & Western were of the same character, but the values were somewhat smaller than those found in the tests on the Illinois Central.

The heavier rail section appeared to give a somewhat higher proportional increase of stress with increase of speed than the lighter. The indications in the tests on track of the Illinois Central were that the Mikado locomotive gave a rate of increase somewhat greater than the Atlantic and the Pacific. The tender trucks gave a still higher rate of increase, though, of course, the amount of the stress was less than that under the drivers.

The proportional increase in the stress for negative moment was large and rather irregular, as would be expected

analysis are less than 10 per cent higher for track with the 125-lb. than for track with the 85-lb. section. For the tests at 5 miles per hour, the values of the bending moment coefficients average nearly 30 per cent higher with the 125-lb. than with the 85-lb. section, considering the drivers and the trailer of the three types of locomotive. For the tests at the higher speeds, the increase is still greater.

CALCUTTA IMPORTED RAILWAY EQUIPMENT to the value of \$1,409,211 in the year ended March 31, 1917, as compared with \$3,968,611, in the corresponding period of 1916, according to the report of Consul General James A. Smith from Calcutta, British India.

CANADIAN VESSEL STATISTICS FOR 1916.—The total number of vessels on the Dominion register at December 31, 1916, was 8,660, measuring 942,598 net tons, a decrease of 97 vessels, and an increase of 13,286 tons, compared with 1915. During 1916, 432 vessels were removed from the register, of which 260 were broken up, reported out of existence, condemned, dismantled or abandoned; 26 were wrecked; 22 were sold to U. S. Government; 1 to French Government; 1 to Russian Government; 20 stranded; 7 lost; 7 abandoned at sea; 2 lost by collision; 14 founded; 18 burnt; 25 transferred to Newfoundland; 17 to Barbadoes; 5 to Great Britain; 1 to Australia; 2 registry no longer required; 3 sunk by mines and 1 by torpedo. It was estimated that 42,566 persons were employed on vessels registered in the Dominion during 1916.—*Canadian Railway and Marine World*.

Canadian Railways and the War*

THE CRISIS in the American coal situation made it necessary to assure the United States that coal supplied to Canada was being used for necessary purposes only and . . . the formation of the Canadian Railway Association for National Defence resulted (October, 1917). To that date the domestic traffic of the Dominion had been kept moving expeditiously, despite war conditions, with the exception of one brief period in the winter of 1916-17.

The Canadian railways had already carried 400,000 troops from recruiting points to concentration centres and from concentration centres to training grounds, and training grounds to ports of embarkation, and these men had been fed and "slept" better than were the troops of any other belligerent nation mobilizing over such an extended area.

Over 70,000 laborers [from Asia] for Europe had been carried across the continent. These also had been fed and "slept" under railway management.

There had been a colossal new burden due to the taking of coal vessels from the St. Lawrence and the lakes for ocean service; to the reduction of staffs to furnish army recruits and many sudden shifting and reversals in the tides of traffic . . . including the flow of Canadian raw materials, some of them never before exported from Canada, into the United States. The passenger train service had been reduced to the extent of 10,000,000 passenger train miles a year, saving 500,000 tons of coal.

The Association has made marked progress. The speed of all trains has been so regulated as to give the maximum of tractive effort from a given amount of coal. Passenger train service has been reduced still further so as to effect a saving of another 2,000,000 passenger-train miles yearly.

The American railways, to equal the Canadian record, would have to cut off 110,000,000 passenger-train miles instead of 20,000,000. The Canadian reduction means a saving of 600,000 tons of coal yearly. Further reductions are under way.

The Railway War Board took charge, in a supervising way, of all traffic difficulties. Potato cars were loaned from one road to meet the shortage on another. Calls for refrigerator cars, apple cars, engines, box-cars—all kinds of equipment—were met through the direction of the Board. A special officer was sent to supervise the coal handling at the Niagara Frontier, with excellent results. A campaign for economy in the ordering of cars and in using their space has been promoted. The surplus of Canadian freight cars in the United States is being steadily reduced through pressure applied. Of these cars 1,300 have come in loaded with anthracite to relieve the coal shortage.

The Outlook

The car shortage, which has been ameliorated, will, it is hoped, be entirely relieved by persuading shippers to load cars to their maximum capacity instead of to less than half their capacity as has been the practice in the past. Steps will be taken also to impress upon shippers and consignees the seriousness of holding cars longer than necessary. The sympathetic co-operation of the Canadian people—shippers, consignees and the travelling public—is a prime necessity. . . . Although it is true that the Canadian railways are organized as nation-wide enterprises, and so have escaped the difficulties experienced by the American lines, and that, being large and few in number, they are able to work to-

gether successfully, nevertheless, congestion on lines outside of Canada, labor shortage and extreme weather conditions, coupled with abnormal traffic demands, make it necessary to load cars to full capacity; to load them promptly and quickly, and to release them at the earliest possible moment.

Embargo Rules of the Railroad Administration

W. C. KENDALL, manager of the car service section of the Railroad Administration has issued circular No. C. S. 1 giving instructions to be observed in the handling of embargoes, in addition to those conveyed in General Order No. C. S. 17 issued by the Commission on Car Service. The instructions, which are issued by authority of the Director General of Railroads and are effective immediately, are as follows:

1. Embargo promptly consignees who do not unload freight promptly on arrival, subject, however, to the approval of the regional director.

2. When a complete embargo is not an essential, the following list of exceptions must be observed so far as practicable and in the order named.

(a) Live stock, perishable.

(b) Coal, coke and charcoal. Acids, alcohol, ammonia, light oil (benzol and toluol), petroleum and its products in tank cars. Empty tank cars.

(c) Food, domestic (not export), for human consumption, including wheat, corn, oats, rye, barley, rice, cereal products, salt, canned goods, sugar, syrup, molasses, peanuts, vegetable oils. Feed, domestic (not export), for animals and poultry, not including hay or straw.

(d) Materials consigned to the United States Government or its authorized agents, including the Public Printer, the Bureau of Engraving and Printing, the Post Office Department, the Navy Department, Navy Yards, and Navy Stations, the Marine Corps, to the American Red Cross, the Imperial Munitions Board, Canada, and shipments of steel, lumber, ties and piling consigned to the United States Shipping Board Emergency Fleet Corporation. (Shipments to the War Department will be more fully dealt with in instructions subsequently to be issued.)

(e) Railroad material and supplies (other than coal or coke), when consigned to an officer destined to a point on his own line.

(f) Printing paper and printing ink. Scrap and waste paper when consigned direct to paper mills or manufacturers.

(g) Agricultural implements and farm machinery required for preparing the soil. Binder twine; canning machinery; carbide; carbon black; chrome, graphite, manganese, and pyrites ore; fertilizer, fertilizer materials, including agricultural lime and pulverized lime stone; field and garden seed, seed grain; food containers (glass, wood, tin or paper); fullers earth; laundry soap and soap powder; medicines, drugs and surgical instruments; mine props, mine wagons, powder, and other materials and supplies necessary for the operation of coal mines; oil well supplies; spraying materials, including arsenic (basis for insecticides), and spraying implements; sulphur; tanners' extract; tin plate for manufacture of tin cans.

3. It should be understood that an embargo placed against carload freight includes less carload shipments of things which are ordinarily forwarded in carload lots.

4. Cars must not be loaded in violation of embargoes. When this is done, agents are not permitted to issue bills of lading and if cars are not unloaded they will be held at point of origin, subject to current demurrage charges until unloaded or until embargo is lifted.

*Abstract of War Board Bulletin No. 1, issued by the Canadian Railway Association for National Defence. The executive committee of this association consists of Lord Shaughnessy, Howard Kelly, Sir William Mackenzie and Alfred H. Smith. The administrative committee consists of U. E. Gillen, D. B. Hanna, C. A. Hayes, Sir George Bury, F. F. Backus, E. D. Bronner and J. H. Walsh. The general secretary is W. M. Neal, 263 St. James St., Montreal.

A Japanese View of Railway Exports to the East

An Interview with Akio Kasama of the Railway Commission Which Has Been Visiting This Country

"THE UNITED STATES AND JAPAN will secure the bulk of the railway supply business in China after the war," said Akio Kasama, secretary of the Imperial Government Railways of Japan to a representative of the *Railway Age*, who called on him at his New York office. Japan and the United States will develop this business, working side by side, at times independently and at times in close co-operation, but always peacefully and without resorting to the mailed fist method of commercial expansion, was the idea hinted at rather than bluntly stated by the diplomatic Japanese representative.

Mr. Kasama has been in this country several months as a member of the Japanese Commission of Inspection which ostensibly has been investigating our transportation system, our mining and our iron and steel manufacturing facilities, but in fact has also been interested in the establishment of a friendly basis of co-operation between the United States and Japan in the Far East. Consequently his viewpoint of American and Japanese co-operation in the Far East in the future may indicate that this understanding was reached on one of the frequent trips this commission made to Washington. Continuing on the subject of future railway business in China, Mr. Kasama pointed out that:

The first need of China is for railroads. Capital must be provided before these railroads can be built, as China is unable to finance them herself. The United States will have the greatest surplus of capital of any nation. Japan will also have capital to invest. Germany will be shut out of the railway supply business in the Far East by unfriendly feeling—to China Germany is virtually an enemy country—and because German capital will be employed in building up her own territory and that of her allies. The English railroad supply industry will be fully employed at home and in her colonies. India alone will be in imperative need of so much equipment that it would take the entire output of the whole English railway supply industry for one year to furnish it. Belgium is no longer a factor in export of railway supplies. France will have her hands more than full at home.

In short, according to Mr. Kasama's ideas, and they are those of the commission of which he is the secretary, the bulk of the railway supply business in China must be taken care of by Japan and the United States, as there will be no other country in a position after the war to handle this kind of business. With the field in China practically abandoned by all save American and Japanese railway supply interests arises an interesting question as to which one will get the lion's share of the business.

The Possibilities of American Export Trade

Japan, said Mr. Kasama, has a large steel plant at Wakamatsu on the island of Kyushu. This plant imports a large portion of its ore or pig iron from China. It is in a position to make all kinds of steel, but its capacity, despite its steady increase, is still insufficient even to care for the domestic demands of the empire. Some two-thirds of Japan's raw steel has to be imported and no less than four-fifths of its steel plates have to come from steel mills in other countries. Mr. Kasama expressed his belief that the United States was the country which should most logically be expected to supply such raw material.

Concerning Japan's railway supply industry, Mr. Kasama said that Japan's car and locomotive plants were well organized and should see a steady development. Unlike

the big steel plant at Wakamatsu these plants are in private hands. They now produce one-third in excess of Japan's own demands, this one-third being available for export to China or other countries. Mr. Kasama did not believe that there would be a great market in Japan for American cars and locomotives or in railway supplies generally except in such things as lubricators, injectors, gages and spring steel which Japan does not supply in sufficient quantities.

On the basis of this situation Mr. Kasama thought that the United States would furnish much of the capital for development of the railways of China and would get its reward largely through the sale of steel and iron, steel plates, shapes, rails, and other semi-manufactured or bulky commodities. Japan's car and locomotive plants with their surplus capacity would fabricate the raw material into cars and locomotives and Japanese labor or Japanese "genius," as he expressed it, would build the railroads and presumably help the Chinese to operate them. Japan, he further added, has adopted the firm policy of encouraging industry in China, particularly iron and steel mills. Presumably it would also encourage the railways there to build their own cars and locomotives. The South Manchurian railway in which the Japanese already have an interest, has made many of its own locomotives for some time.

The *Railway Age* representative expressed his doubts as to whether American bankers would desire to invest capital on the basis outlined. Mr. Kasama did not doubt that China is so vast and its needs for new railroad lines so great that undoubtedly American and Japanese interests would find plenty of room to work independently.

The Siems-Carey Railway & Canal Company, the protégé of the American International Corporation and the National City Bank, furnishes an example of an independent American project, that company now having all plans made, including those for financing, for construction of 2,600 miles of railroad built to American standards practically throughout and equipped naturally by American railway supply companies. This railroad will serve a territory with hundreds of millions of inhabitants and of untold wealth in undeveloped resources. Other and similar entirely American projects are in contemplation.

The Commission's Personnel

The commission representing the Imperial Government Railways of Japan came to this country last October. It was headed by Dr. Shima and consisted of two other members and an accompanying staff. All three of the members stand high in the affairs of the Japanese railways. Dr. Shima is the director of the machinery and rolling stock department of the Imperial Government Railways and professor of mechanical engineering of the College of Engineering of Tokyo University. Akio Kasama, the secretary of the commission, occupies a position no less important than that of secretary of the Imperial Government Railways and on the commission represents the financial department. J. Nakamura, the third member, is a civil engineer, holding the position of assistant traffic manager in charge of the passenger section, a position similar to our general passenger agent or passenger traffic manager. Dr. Shima has since returned to Japan, Mr. Nakamura expects to return shortly, while Mr. Kasama will remain in this country to observe particularly the working out of the government control of railroads under Mr. McAdoo.

When speaking to the *Railway Age* representative, Mr.

Kasama outlined the commission's three extensive trips over the railroads of almost the entire country, the commission's mission in the United States, the possibilities of the American railway supply industry in the Far East, and he also expressed some opinions on American railroad operation.

The Commission's Three Trips

The commission's first trip was from San Francisco to Washington and New York. On the Pacific coast some time was spent inspecting the terminals and water front facilities at San Francisco and Los Angeles and in examining the methods of train despatching, signaling and yard operation. The commission then came east to Colorado and a stop was made at Pueblo to visit the plant of the Colorado Fuel & Iron Company, with which company the commission has since placed an order for 20,000 tons of standard American 75-lb. rails. From thence the party traveled east through Denver, Ogden, Omaha, Chicago, reaching New York early in November. At New York some time was spent in looking over the extensive terminals, particularly those of the New York Central and Pennsylvania, in inspecting the waterfront, including the Bush Terminal and other facilities, and considerable interest was shown in the construction and operation of New York's subway lines. The party then went on to Washington and considerable time was spent in visiting the Department of Commerce, the Railroads' War Board, the Interstate Commerce Commission, the Bureau of Railway Economics, the Bureau of Standards and other organizations and bureaus. Mr. Kasama expressed the commission's appreciation of the courtesy shown its members in Washington and commented on the co-operation extended by all with whom the members came in contact.

The commission then returned to New York, spending some time in Baltimore to inspect the Baltimore & Ohio's terminal facilities and particularly its coal handling plants.

The extensive western trip followed soon after. The commission first went to Schenectady to visit the plants of the General Electric Company and the American Locomotive Company, whence it went to Buffalo where considerable time was spent in examining the terminal facilities. From there the commission went to Chicago, from there to Duluth, Hibbing, Minneapolis, Sault Ste. Marie, Detroit, Cleveland, Ashtabula, Youngstown, Pittsburgh, Johnstown and Philadelphia. Railways, railway terminal facilities, iron mining, ore and coal handling and steel manufacture received their due consideration. At Sault Ste. Marie the commission showed particular interest in the canal and at Detroit in the automobile manufacture.

The third trip was that taken by the party on Dr. Shima's return trip to Japan. First, the commission went to Washington. From there its members went to Norfolk, where the coal handling facilities were inspected, thence to Bluefield where the Norfolk & Western's electrical installation came in for attention. Thence the commission went west over the Chicago, Milwaukee & St. Paul's electrification and over the Great Northern to Seattle where the handling of lumber was looked into. The party arrived in San Francisco late in December and Dr. Shima sailed on December 28, the day that Mr. McAdoo received his appointment as Director-General of railroads.

The Mission

One of the commission's purposes in coming to this country was to look into American railroad practice, the other to secure plates and other railway materials for export to Japan. Japan at the present time is contemplating the conversion of its lines to standard gage. The mileage of the empire totals about 10,000 of which 5,600 is directly operated by the Imperial Railways. The gage of nearly all of Japan's mileage is 3 ft. 6 in., but there are small sections

of 4 ft. 8½ in. gage and the railways operated by the Japanese government in Chosen are all of standard gage. The project of standardization is now in contemplation. The commission, said Mr. Kasama, expected that a bill providing for its carrying out would be introduced in the Diet this year, but recent advices to the commission announce its postponement until the next Diet which convenes next December. On account of this proposed standardization of gages the commission was particularly interested in the methods employed in parts of this country which were visited for transferring freight from narrow to standard gage railroads.

The commission was particularly on the lookout for ideas in American railroad operation that might prove worthy of adoption in Japan. As one result of the investigations, the Japanese railway administration is going to equip a complete train with American standards practically throughout with a view to observing the adaptability under Japanese conditions of automatic couplers, M. C. B. journal boxes, etc.

One of the results of the mission's visit has been the placing of the order for 20,000 tons of rails mentioned above. As a matter of fact, the commission has had in mind the securing of some of the tonnage previously decided on for the rails for the Russian railways. But further than that the commission has been trying to secure licenses for car plates and other materials for cars, locomotives and other railway equipment. This is not the same thing as the ship plates, Mr. Kasama emphasized, as the ship plates matter is in the hands of another commission.

Amazed at Passengers' Patience

Mr. Kasama was asked to express an opinion on American railroad operation. The commission, he said, was impressed by the size of the American cars and locomotives and the extensive terminals. "But," he added, "Dr. Shima and the rest of us were simply amazed at the patience of the American traveler. When a train is two hours or three hours late, the American just folds his hands and says, 'I wonder what's wrong. Well, I suppose something has happened and it can't be helped,' whereas if a train is late in Japan, the papers print long articles about it and the government is held responsible." Mr. Kasama did agree, however, that the tremendous strain on the railroads and the extremely bad weather conditions may have been largely responsible for some of the delay. Mr. Kasama also commented on the great number of competing and only partly filled passenger trains, but added that the taking off of so many trains lately had undoubtedly largely eliminated the waste in passenger service. He also complained about the lack of care in indicating the destination of trains. In Japan, he said, the trains always left and always arrived on the same track and signs were displayed on the trains themselves. Here, he noted, the trains are often changed from one track to another, sometimes at the last minute, and he commented on the fact that, according to his observation, passengers always asked the conductor whether the train was bound. Of course, he agreed that the present war-time conditions may have had considerable to do with the lack of smoothness in passenger train operation.

ALL AMERICANS CAN SERVE.—Every man, woman, and child in this country, who wants to serve the country, can serve it and serve it in a very simple and effective way, Secretary McAdoo says. That service is to lend your money to the government. Every 25 cents loaned to the government is a help at this time and practically every man, woman, and child by making some trifling sacrifice, some denial of a pleasure, or giving up some indulgence, can render the government that support.

Hearings Before Railroad Wage Commission

Representatives of Employees Complete Testimony. Railroad Officers Concede Need for Higher Wages

THE RAILROAD WAGE COMMISSION on February 14 finished taking the testimony of representatives of labor organizations and of unorganized employees who had asked to be heard regarding their requests for increased wages and adjourned subject to the call of the chairman. Meanwhile the boards of statisticians and examiners appointed by the commission will continue their work of investigating the entire wage situation from the available statistics supplemented by the testimony and exhibits that have been presented by the witnesses. Testimony of railroad officers was begun on February 18.

Among the witnesses heard on February 13 was W. G. Edey, representing train despatchers on the Seaboard Air Line, who asked for the same scale that had been requested by other despatchers. He denied charges made by brotherhood officers that the railroad officers were trying to prevent transportation efficiency and he cited examples of engineers on the Seaboard who were receiving high wages.

James A. Hennessey, representing dining car stewards on the Pennsylvania, asked for an increase of 20 per cent in wages, with a minimum of \$150 a month, and shorter hours, with at least four days a month off.

A. B. Jenkins, representing the International Union of Molders, asked for increases of approximately 33 1/3 per cent.

E. T. Thompson, appearing on behalf of colored helpers and laborers of the southeastern roads, asked for a 20 per cent increase.

The testimony of Warren S. Stone, grand chief of the Brotherhood of Locomotive Engineers, on February 13, was only briefly referred to in last week's issue. He told the commission that at the time the railways were taken over by the government the engineers had no concerted wage movement in progress, that he had advised against it because he did not want to do anything that would jeopardize the country in keeping the lines of communication open. He said that the brotherhood had furnished men for the engineering regiments for service in France and he expected his men to make sacrifices on account of the war and that the lower paid employees should receive first consideration, but that the engineers as a class were not highly paid and that they should have an increase to partly meet the increased cost of living, to a minimum of \$6 a day.

He read sworn statements from engineers in various classes of service showing their wages for the month of January for eight hours' work a day for 30 days and their family expense accounts. The examples he cited were all of men with families of five or six, and the earnings ranged from \$103 to \$184, while in many cases the expenses for the month amounted to more than the earnings. All were making payments on Liberty Bonds. The man who earned \$184 ran 4,500 miles in passenger service. The engineer who runs the Congressional Limited train, he said, a picked man, who has to read correctly nearly 400 signals in 100 miles, is paid \$4.25 for 100 miles while unskilled negro laborers on government buildings in Washington receive \$5 a day. He quoted the various rates paid to engineers for eight hours or 100 miles, saying that if a man earned more than the daily rate it was by working overtime or making excess miles and he cited a table in the report of the Eight-Hour Commission showing the number of men receiving various amounts. This indicated, Mr. Stone said, that 50 per cent of the engineers earn less than \$150 a month.

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About 95 per cent of the men in yard service had been put on an eight-hour basis, he said, but when the wage movement was started by the conductors and trainmen the roads began to increase their hours in order to show higher average earnings.

When Chairman Lane asked if the longer hours were not due to winter conditions Mr. Stone replied that he did not think so, and that there would be no shortage of men if the railroads would pay more. Engineers were remaining in service when they could get better pay elsewhere, rather than lose their seniority rights.

Referring to charges made by Mr. Shea that railroads were increasing their violations of the 16-hour law, Mr. Stone said one of his local chairmen had seen an order signed by Regional Director A. H. Smith directing the roads to disregard the law and to run engines to their terminals. This resulted, he said, in men working 20 to 30 hours. He had wired Director General McAdoo about the order and had received a reply: "No authority has been given for violation of hours of service law. I have so instructed the Regional Director."

Commissioner McChord remarked that an investigation is being made of reports of disregard of the law and a report is to be made to Mr. McAdoo.

Referring to questions put to Mr. Shea regarding the possibility of the firemen saving coal, Mr. Stone said that hundreds of thousands of tons of coal are wasted on the railroads but that the waste is "all down the line" and it is necessary to begin "back of the firemen." "It is no use to talk to the firemen about saving coal," he said, "when his engine is in such poor condition that it is wasting coal every minute. The roads have got to get their power in shape and their terminals and roundhouses. Some roads last year made no provision for winter at all." He said that the railroads had never before entered the winter season with power in such bad condition but he denied that it was due to shortage of men so much as failure to pay enough to attract good men. He also criticised the practice of employing women for heavy work, saying that England had not done so until after it had been in the war for a long time but that in this country the plan had been adopted "before we even got started in the war."

Chairman Lane, who has tried to bring out from most of the witnesses some idea of the proper relation between wages in various classes of employment, asked Mr. Stone about the relation between the wages of engineers and other employees. Mr. Stone said there was no definite relation but that the firemen's pay had been increased in greater proportion than that of the engineers because the larger engines had increased his work. Chairman Lane remarked about the responsibility of the despatcher. Mr. Stone said he did not want to disparage the despatchers but he did not think their responsibility as great as that of the engineer. He told the commission that of 100 firemen only 17 become engineers and of the 17 engineers only 6 become passenger engineers.

B. F. Richardson of the American Federation of Railroad Workers, appeared on behalf of men in the mechanical and bridge and building departments.

J. A. Franklin appeared on behalf of the railroad department of the American Federation of Labor, representing men in the mechanical trades, helpers and apprentices and railway clerks. He asked for \$6 a day for skilled em-

ployees and \$4.50 for helpers and described how these men had left the railroad service for higher wages elsewhere.

A. E. Barker, for the International Brotherhood of Maintenance of Way Employees, asked for \$3.25 to \$3.50 a day for section men and \$110 to \$140 a month for section foremen.

J. B. Parsons and F. R. Weller testified on behalf of civil engineers in construction and maintenance of way work. They did not ask for specific increases but that their case should be taken into consideration. Mr. Parsons contrasted the pay received by draftsmen, transitmen and other technically educated men with the wages of trainmen and mechanics.

Chairman Lane made a rough calculation when Mr. Franklin was speaking that the increases he asked would amount to \$82,000,000 a year. He pointed out that the increased wages would probably have to be paid by shippers but said he did not think the possibility of an increase in rates should be a bar to reasonable wages.

Railroad Officers Testify

The necessity for increased wages for a large proportion of the railway employees was conceded by the representatives of the railroads who appeared before the commission on February 18. They appeared at the invitation of the commission and said their purpose was not to oppose requests made by the employees, but merely to aid the commission by giving information. No one is more keenly aware than the railroad managements that many employees are not properly compensated, said J. G. Walber, secretary of the Bureau of Information of the Eastern Railroads, but he denied that the railroads had intentionally discriminated against organized and unorganized employees and said they had attempted to do what they could with their available resources to improve the condition of labor. Railroad officials need no evidence that the cost of living has increased and that the lower paid men need assistance during the war, said J. W. Higgins, chairman of the Association of Western Railways. Mr. Higgins expressed the opinion that all men receiving less than \$150 a month needed an increase and that perhaps the figure should be placed at \$2,000 a year, this being the amount exempted from the income tax by the government. Of course, he said, men drawing less than \$100 a month are entitled to greater consideration than those paid as much as \$150 a month.

Mr. Walber outlined the history of concerted wage movements in eastern territory and explained the necessity for an organization on the part of the railroads to deal with such movements and he described in a general way some of the wage schedules and their development for the purpose of showing that their effect upon wages is measured not merely by the rates, but also by the rules which affect the earning power of the employees. After railroad traffic began to pick up in 1915, he said, there was a general movement on the part of the railroads to increase wages among their unorganized employees without concerted demands. This began even before the railroads felt to any considerable extent the competition of munitions plants and other industries and went on all through 1916 and 1917. He had been unable to compile comprehensive statistics covering these individual increases because there was such a shortage of clerks that it was difficult to secure statistical information from the railroads, but he thought that skilled labor and clerks had received increases averaging about 15 per cent and that unskilled labor had received increases from 25 to 100 per cent. Meanwhile, the train employees continued under their former scales except as modified by the Adamson law settlement. He mentioned these things to show that the railroads had endeavored to take care of their employees in the best way that they could, but said they were unable to take care of all the employees. The telegraph operators, he said, have

received more adjustments since 1910 than any other organization and he submitted a tabulation showing the wages of 24,000 men on the eastern railroads averaging \$79 a month.

Mr. Walber said it was true that when rates of wages are increased the railroads often try to readjust their operating conditions in order to reduce the cost and to avoid the penalties, but to show the effect of wage adjustments he presented figures showing that if the 1909 basis had been in effect in 1915 the pay of the engineers on the eastern railroads would have been approximately \$6,000,000, or 18.3 per cent less than it was, and 3.57 per cent of the increase was due to changes in rules rather than the changes in the rates. Firemen had received an increase of \$5,205,000, or 25.61 per cent, of which 21.68 per cent was due to changed rates of pay and 3.98 per cent due to changes in the schedule rules. The conductors had received an increase of \$5,439,000, or 23.32 per cent, of which 3.54 per cent was due to the rules. Other trainmen had received an increase of \$12,300,000, or 29.91 per cent, of which 8 1/2 per cent was due to the rules.

As to the effect of the Adamson law settlement, he said, the report of the Eight-Hour Commission speaks for itself, but in reply to some criticisms of it made by representatives of the brotherhoods he wished to state that with the exception of one statement dealing with delays between terminals, the statements in the report were made up by compilation of the time slips prepared by the men themselves. The railroads had merely compiled the information and the brotherhoods had had representatives at every conference and had the opportunity to check all the figures. Because the commission was allowed only \$25,000 for its expenses, the railroads had had to assume the expense of printing forms and compiling information. One form had cost \$20,000 to print. He said it was unfair to criticize the information because it was furnished by the railroads, because no one else could furnish it.

H. B. Perham, president of the Order of Railway Telegraphers, had told the commission about some station agents on the Central Vermont paid from \$30 to \$45 a month. Mr. Walber had made an investigation and found that the man paid \$30 a month was merely a caretaker of a very small station and his main business was that of a farmer. The men receiving \$45 a month were either mere caretakers or received additional income from commissions on express business. Mr. Walber also replied to statements made by Timothy Shea, assistant president of the Brotherhood of Locomotive Firemen and Enginemen, that railroads have tried to avoid paying increased wages awarded by various boards to the hostlers and that on one eastern road the road foreman of the engineers had written to a hostler changing his classification to that of engine repairer and giving him an increase from \$65 to \$70 a month instead of giving him the pay awarded to hostlers. Mr. Walber said he thought the eastern railroads had settled all controversies regarding the hostler question and on looking the matter up had found that the arrangement with this hostler had been the result of a mutual agreement between the railroad and the brotherhood, of which Mr. Shea had been advised, and that the man concerned was at an outlying point where he merely had to clean the fire and take care of one engine during the night.

Mr. Walber also submitted to the commission a large amount of statistical information regarding wages on the eastern railroads and information regarding their wage contracts. All the roads, he said, have contracts with the four brotherhoods. Most of them have contracts with the Order of Railway Telegraphers, only a few have contracts with the shopmen, but many have agreements with the employees on their roads if not with an organization. He thought that probably about 25 per cent of the employees were organized.

Mr. Higgins apparently caused some surprise when he advocated increases for employees earning less than \$2,000

a year. Chairman Lane remarked that that would include a very large proportion of the employees. Mr. Higgins said it would leave out many of the engineers and conductors. To show the trend of wages of the train employees, Mr. Higgins presented a compilation taken from the Interstate Commerce Commission reports showing that the average wage of the train employees for all roads had increased from \$810 a year in 1900, to \$884 in 1905; \$993 in 1910, and \$1,249 in 1914. Since 1914, he said, the statistics have not been on a comparable basis. Combining ton miles and passenger miles and referring to them as traffic units Mr. Higgins showed that in 1900 the number of traffic units per train employee was 824,000; in 1905, 793,000; in 1910, 902,000; and 1914, 1,037,000. The wages per train mile were 17.46 cents in 1900, 22.58 cents in 1905, 25.89 cents in 1910, and 31.36 cents in 1914. For each dollar paid in wages to train employees the railroads had received 1,018 traffic units in 1900, 896 in 1905, 908 in 1910 and 830 in 1914. In other words, while wages per employee had increased 54 per cent and wages per train mile had increased 79 per cent, the number of traffic units per employee had increased only 26 per cent and the number of traffic units per dollar had decreased.

Mr. Higgins outlined the concerted wage movements in western territory and then, to show the amount of recent increases in wages, mainly to the unorganized employees, he gave figures for nine western railroads, representing about 75,000 miles of line, which he had received by telegraph since he came to Washington. He had asked for these because the representatives of the employees had apparently given the commission the impression that the railroads had done nothing for their unorganized men. In 1916 these nine roads employed 319,185 men and their increase in wages during the year 1916 amounted to \$11,073,094, or an average of \$34.69. This figure does not represent the increase in wages per man for a full year, but is simply the average of the increases actually paid that year, some of which extended through only a small part of the year. In 1917 the same roads had 340,436 employees, an increase of about 6.7 per cent, while the payroll for the year increased \$39,013,612, an average of \$114.89 per man. While this included the effect of the Adamson law, Mr. Higgins said, that was a small matter, compared with the other increases paid. The total increase in wages for 1916 and 1917 on these roads amounted to \$50,186,706, an average of \$149.58, and if the same proportion of increase had been paid by all roads in the country it would amount to approximately \$250,000,000. The bulk of the increases were made in the latter part of 1917 and have only recently been reflected in the figures.

The largest recent request for an increase in wages was that of the conductors and trainmen. He had made a compilation for 63,000 miles of road, for which he had received returns, showing that the men included in this request in the month of October, 1917, had received in wages \$4,425,000 and that in their proposed schedule, without the request for time and a half overtime which they have since submitted to the government, the increase would have amounted to \$1,362,415 for the month, or 30.8 per cent.

Mr. Higgins said that in replying to his telegrams some of the nine roads had included their entire payroll, including officers, while others had omitted the officers, but he gave the figures by individual roads to show that the average increases per man on some of the roads that had omitted the officers were higher than the averages on the roads which had included the officers. Commissioner McChord remarked about the inclusion of officers' salaries, but Mr. Higgins said he thought that would make but little difference as he did not think officers' salaries had been increased recently, although many of the lower paid officers ought to have an increase.

"Do you think any of these officers ought to have their salaries reduced?" asked Commissioner McChord.

"I am not in a position to answer that," Mr. Higgins said, "but I think that after a man has spent his lifetime acquiring the knowledge and the capacity to handle a railroad, he is entitled to fair compensation."

F. W. Brown, assistant to the vice-president of the Southern Railway, testified regarding wage schedules in the southeastern district.

Chairman Lane asked that information be filed for the eastern, southern and western districts, showing all increases in wages since January 1, 1916. The Wage Commission has also addressed a circular letter to all of the roads, asking for information regarding the number, wages and hours of their employees by classes, showing the number of men receiving wages classed by \$10 a month grades, and also showing the number of men and the amount of wages that would be required to put all employees on a basis of eight hours a day and 26 days a month.

E. T. Whiter, assistant general manager of the Pennsylvania Western Lines, described the work and conditions of employment of train despatchers and operators and the operation of trains. He said train despatchers receive about \$150 a month, work eight hours a day, usually have one day off a week, and two weeks' vacation, and in reply to statements that there is little opportunity for promotion, he mentioned that four vice-presidents of the Pennsylvania were formerly train despatchers and a large number of other officers. Regarding the demand of despatchers for an extra rate of pay for overtime and on Sundays, he said it would be feasible to provide that they should have one day off a week, but that to give the men Sundays off would require an additional set of despatchers and as the railroad runs every day the pay should be the same for Sundays as for any day. He said the Pennsylvania System had never dealt collectively with employees' organizations except with the train employees and had not made a contract with them until 1910, but to show how it had treated its employees, he said that since 1900 the Pennsylvania Lines West have made horizontal increases to all employees of: 10 per cent in November, 1900; 10 per cent in December, 1906; 6 per cent in April, 1910; the latter increase including train employees. Train despatchers had received an increase in 1913 of 6 per cent, in 1916 of 4 per cent, 1917 of 8 per cent. Telegraph operators in addition to the horizontal increases had received 5 per cent in July, 1911; 4½ per cent in July, 1914; \$5 a month on February 1, 1916; \$5 a month on February 1, 1917, and another \$5 a month on November 1, 1917. Other employees received an increase of 6 per cent in 1913 and of 8 per cent in 1917. Station agents and their forces receiving less than \$250 a month were given two increases in 1917 amounting to about 14 per cent and now receive from \$50 to \$200 a month, the majority from \$75 to \$125. Telegraph operators receive \$70 to \$111, averaging \$85.70. Yardmasters receive from \$140 to \$185, averaging about \$160. Yard clerks receive from \$60 to \$125, averaging about \$75. Various adjustments were also made with the shop employees in the year 1917, and in many cases the piece-workers receive more than their foremen.

In 1918 the payroll of the Pennsylvania Lines West was \$12,000,000 greater than in 1916, about \$3,500,000 representing the increases on account of the Adamson law for 15,000 employees and \$8,500,000 representing increases to 55,000 other employees. To illustrate the difficulty in securing men for railroad service, Mr. Whiter said that on the lines west on September 1, 1917, there were in service 67,790 men in maintenance and transportation departments as compared with 65,162 on September 1, 1916. About 40,000 had been in the service of the company for over a year, but to secure the 27,000 new men in nine months 83,000 men had been employed. In other words, three men were employed

for every vacancy because the men stayed such a short time, being attracted by the higher pay offered by industrial concerns.

Other railroad officers testified regarding the wages and working conditions in various departments, including F. G. Nicholson, assistant to the receiver, Chicago & Eastern Illinois; P. T. Latimer of the Chicago, Burlington & Quincy; C. H. Niemeyer, assistant engineer, maintenance of way, Pennsylvania Lines West; E. L. King, superintendent of telegraph of the Southern Pacific; E. C. Wills of the Missouri Pacific; C. P. Conklin of the New York, New Haven & Hartford; W. J. Tollerton, general mechanical superintendent of the Chicago, Rock Island & Pacific; D. R. MacBain, superintendent of motive power of the New York Central; E. F. Potter, assistant to general manager of the Minneapolis, St. Paul & Sault Ste. Marie; and J. R. W. Davis, engineer maintenance of way of the Great Northern.

Railroad Officers Not Disloyal

THE FOLLOWING is an extract from Interstate Commerce Commissioner George W. Anderson's speech to the New England Traffic Club at Boston on February 12, 1918:

There is one thing more I want to say to you. Of course there are all kinds of nasty rumors afloat as to bad faith on the part of railroad officials and of railroad employees—of an alleged desire that federal control be a failure—stories that they are holding up trains, allowing congestions to take place, and doing other things to impede traffic. I want to make my position on that entirely clear. It is this: I do not believe those stories. We in Washington are going to assume good faith and loyalty until the contrary is ascertained to be the fact. We are not going to assume that railroad officials and railroad employees are playing double with the American people in time of war until it is proved that they are playing double. And let me add that in my opinion, if disloyalty and double-dealing are ever proved, they will be proved against a very small number of men. But there will be no dealing with alleged disloyalty and bad faith by any brash guesswork. We propose to know what we are doing before we charge men—whether they be highly paid officials or moderately paid wage earners—with disloyalty. But if we find there is disloyalty, God help the men against whom it is proved.

And so when you see newspaper reports indicating that the railroad service is as "honey-combed with treason and disloyalty" as this region is "honey-combed with German spies" according to the Boston Herald and the Boston Transcript, you need not assume that it is true or that we in Washington are to work on the assumption that it is true. On the other hand, if you find evidence—real evidence—which indicates to a reasonable fact-respecting mind that there is disloyalty, let us have that evidence.

For my part, I have a profound belief in the loyalty and patriotism of the American citizen. And I care little whether he or his father or his grandfather was born in this country or was not born here. If there is anything that we in America need to keep in mind at the present time, it is that we are all immigrants. The only difference is as to the date of our immigration. It is high time that we had an end of charging disloyalty and treason simply because some of our best citizens have names which are not as nasal and as Yankee as some of our names. I will go further and say that I believe that a large share of the men with German names and Austrian names are just as good American citizens as those that have Scotch names like my own. Because my ancestors came over here a couple of hundred years ago it does not follow that I am any better an American citizen than those who have come here more recently. The Germans that came over here

after the '48 revolution because they could not stand in Germany the sort of thing that has now involved the whole world in war—the sort of American citizens typified by Carl Schurz—are just as good citizens as any of us, and they are not to blame because their names are German names. I am bitterly indignant at a denunciation of American citizens grounded simply upon the fact that their names are not what their denunciators would best like. I regard that attitude of mind as a menace to our public safety—as a threat against success in the cause into which we are putting the best of our American youth. I regard the propaganda of hate and denunciation emanating from some of our newspapers and magazines as a distinct public danger. This is no time for ill-grounded, vituperative, prejudiced denunciation. Wholesome criticism helps. Wild, lurid denunciation never helps.

What I am saying as to the broader question applies to the railroad situation. There will be plenty of mistakes made. We who are in office will make our share of mistakes. We expect to be criticised for our mistakes, but we don't expect to be denounced for them. We need enlightenment. Nobody realizes it better than we who have to make decisions on questions that it is almost impossible to decide. The men operating the railroads will make mistakes. A great many officials will have difficulty in comprehending the new national status and in forgetting that they are not working for the same old corporation, bound to get traffic for it and the most lucrative return for it. They must reorganize their mental processes, their mental habits and readjust them to the new status during the war period. Some of them will not do it easily. But if they act in good faith, are loyal to the cause, are genuine American citizens, deal with the problem and with us frankly and honestly, they will get a square deal. We who have official responsibility are going to give a square deal if we know how, and we expect a square deal. In a word, the administration assumes good faith—the American people demand of us and of everybody else in the public service good faith—we believe we shall have good faith.



New York World.

In Need of Repairs

Reduce Dynamic Augment for Heavy Locomotives*

The Need for Reducing the Weight of Reciprocating Parts; How the Reduction May Be Effected

By E. W. Strong

American Vanadium Company, Pittsburgh, Pa.

IN no decade in the history of the American locomotive have there been more and greater improvements in design than in the last 10 years. What is rightly called the modern American locomotive is a very different machine from that of 10 years ago. Through the development of correct boiler and cylinder proportions; by the application of fuel-saving and capacity-increasing devices, and by refinements in detail design, the modern locomotive has been brought to a high degree of efficiency in operation and maintenance.

Through these means, and the introduction of new types of wheel arrangements, tremendous progress has been made in the construction of more and more powerful units to meet the never-ceasing demand for greater hauling capacity.

But in one respect there has been, generally speaking, no progress; to the contrary, approved practice is not on a par with that of 10 years ago. This is in regard to the weights of the reciprocating and revolving parts per unit of load. H. A. F. Campbell in his series of articles on "Reciprocating and Revolving Parts," which began in the Railway Age Gazette, Mechanical Edition, March, 1915, presents data which discloses this fact very forcefully. And this condition exists in face of the fact that never before has there been greater opportunity for betterment by taking full advantage of the developments in locomotive materials.

The present heavy moving parts result in a large unbalanced weight in the wheel counterbalances. This, revolving at high speed, has a great centrifugal force (commonly referred to as the dynamic augment), alternately increasing and decreasing the rail pressure on a wheel point. The principle is the same whether the dynamic augment is due to the overbalance of the weight added to partly balance the reciprocating parts, or that due to the lack of balance to fully balance the revolving parts, which condition sometimes exists in the case of the main wheel with relatively small drivers and long stroke.

While it is perfectly true that with the enormous increase in wheel loads the ratio between the dynamic augment at diameter speed† and the static weight per wheel is no greater today in high speed engines than it was 25 years ago, it is equally true that present tremendous static wheel loads more nearly approach the capacity of the track. There is less margin of track capacity and less opportunity for increasing it. Furthermore, it is no longer the high speed engine which requires the most serious consideration, but the freight engine. And in the latter class it is not the dynamic augment due to the weight required to balance the reciprocating parts, but that due to lack of weight in the main counterweight to balance the revolving weight on the main crank pin.

This is particularly true of the 2-10-2 type locomotive. In most existing engines of this type the lack of balance for revolving weight in the main wheel causes a much greater dynamic augment than the excess balance in the other wheels for the reciprocating parts. The dynamic augment in the main wheel is, of course, directly opposite to that in the other wheels.

*From a paper read before the February, 1918, meeting of the New York Railroad Club.

†Speed in miles per hour equal to the diameter of the drivers in inches.

Fig. 1 gives a graphical representation of the dynamic augment in the main and other wheels of a representative 2-10-2 type locomotive at diameter speed. The curves represent the action of the unbalanced weight throughout a complete revolution of the respective driving wheels. In the example selected, the engine had the following proportions:

Boiler pressure	200 lb.
Cylinders	31 in. by 32 in.
Drivers, diameter	63 in.
Total weight in working order.....	401,000 lb.
Weight on drivers.....	335,000 lb.
Weight of reciprocating parts per side.....	2,604 lb.
Ratio of weight of reciprocating parts to total weight of engine	1/152
Piston thrust per pound of reciprocating weight.....	57.9 lb.
Revolving weight on main wheel.....	1,912 lb.

In this case, only 35 per cent of the reciprocating weight was balanced. The main counterweight lacks 691 lb. of balancing the revolving weights on the main pin. The average excess balance in the other wheels was 408 lb. Fig. 2 represents graphically the maximum dynamic augment in

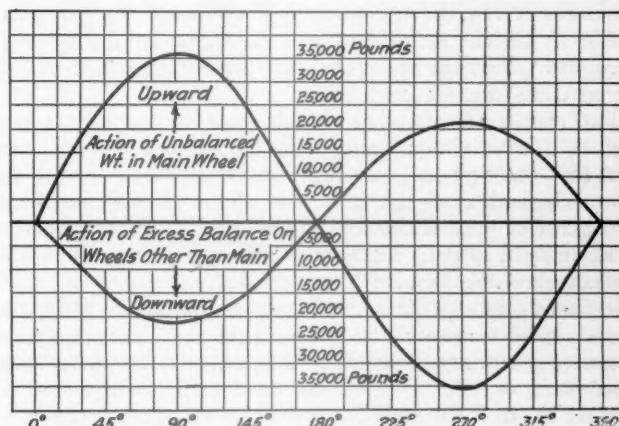


Fig. 1. Action of Unbalanced Weights in Wheels of a Representative 2-10-2 Type Locomotive

the main and other wheels of the same engine at various speeds from 15 miles per hour up to diameter speed. At 40 miles per hour, which is probably the maximum speed which this engine would ever attain, the dynamic augment in the main and other wheels is respectively 14,200 lb. and 8,400 lb., or 42½ per cent and 25 per cent, respectively, of the static weight of the wheel on the rail. Further, when the pressure of the main wheel on the rail is at its maximum the pressure of the other wheels is at a minimum. The charts and the above figures refer to the dynamic augments in single wheels only and not to the combined augments of the counterbalances in the corresponding pairs.

The above example is not extreme. The engine selected is a very appropriate example, because it was built largely to the railroad's designs. It is the mechanical departments of the roads that must be impressed with the necessity of improvement in existing counterbalance conditions.

Fig. 3 is a chart similar to Fig. 2, representing the dynamic augment in a representative 4-6-2 type locomotive with 60 per cent of the weight of the reciprocating parts

balanced. In this case, of course, there was no difficulty in fully balancing the revolving weights on the main pin. This engine has the following proportions:

Boiler pressure	200 lb.
Cylinders	27 in. by 28 in.
Drivers, diameter	73 in.
Total weight in working order	305,500 lb.
Weight on drivers	197,300 lb.
Weight of reciprocating parts, per side	1,880 lb.
Ratio of weight of reciprocating parts to total weight of engine	1/162
Piston thrust per pound of reciprocating weight	64 lb.

The factor which made possible the development of the Pennsylvania Class E6 engines was the use of especially light reciprocating parts. With 66,500 lb. on a single pair of drivers, these engines established a record. By so reducing the weight of the reciprocating parts as to keep the dynamic augment within 30 per cent of the static weight on a wheel point, it was possible safely to use this enormous axle load. In fact, these engines produce less strain on track and bridges than many having 10,000 lb. to 12,000 lb. less weight on drivers.

The locomotive impact tests made by the Chicago, Burlington & Quincy point very clearly to the possibilities of using heavier and more powerful units on track that is at present loaded to capacity, through simply lightening the reciprocating and revolving parts, with consequent reduction in the dynamic augment. Four locomotives were tested, two of the 2-10-2 type and two of the Pacific type. In each pair, one engine had especially light reciprocating parts made of heat-treated alloy steel and the other parts made of ordinary steel. The two 2-10-2 type engines had approximately the same weight on drivers, while the reciprocating parts in one weighed 16 per cent less than in the other. With the Pacific type locomotives, the one with light reciprocating parts was 16,600 lb. heavier on drivers and had 6,600 lb. greater tractive effort, while the weight of the reciprocating parts was 5 per cent less than in the other.

The results showed that, in the case of the 2-10-2 type engines, the maximum impact on the rail of the one with light reciprocating parts was 35 per cent less than that of the other. In both cases the speed was about 40 miles per hour. In the case of the Pacifics, the one with the light reciprocating parts, though 10 per cent heavier on drivers than the other, produced less stress on track and bridges.

By taking advantage of the greater strength of alloy and special steel forgings and castings to use increased unit stresses, by using hollow bored crank pins and piston rods, rolled steel or alloy and special cast steel pistons, and by special care in the design of all details, a large percentage of saving can be effected in the weights of reciprocating parts.

TABLE I.—WEIGHT OF RECIPROCATING PARTS OF THREE CLASSES OF PENNSYLVANIA LOCOMOTIVES

	4-4-2	4-6-2	2-8-2
Total weight	240,000 lb.	305,000 lb.	315,000 lb.
Weight on drivers	133,100 lb.	200,000 lb.	238,000 lb.
Cylinders	23 1/2 by 26 in.	27 in. by 28 in.	27 in. by 30 in.
Diameter of drivers	80 in.	80 in.	62 in.
Piston thrust	89,000 lb.	114,000 lb.	114,000 lb.
Weight of reciprocating parts per side	1,014 lb.	1,376 lb.	1,470 lb.
Piston thrust per pound reciprocating weight	87 lb.	83 lb.	77 lb.

By far the great majority of roads using alloy steel forgings have been content to utilize them to provide an increased factor of safety. The few cases in which advantage has been taken of high tensile steels to reduce weights of reciprocating parts serve to show the possibilities. The Pennsylvania Railroad was the first to use especially light reciprocating parts; and still furnishes the most conspicuous example of such practice.

The weights of the reciprocating parts and the general proportions of three of their standard classes of road engines are given in Table I. For main and side rods, piston rods, pins and valve motion parts they use carbon steel, heat-

treated to give a minimum elastic limit of 50,000 lb., and 80,000 lb. tensile strength. Rolled steel pistons are employed; while the crossheads are made of .40 carbon electric furnace cast steel, having a tensile strength of 70,000 to 80,000 lb. per sq. in. By using sections which take full advantage of the greater strength of the materials employed, combined with the greatest care and attention to detail design, exceptionally light reciprocating parts have been attained.

The Pacific and 2-10-2 type locomotives on the C. B. & Q. previously referred to, are other well known examples of the application of especially light reciprocating parts. On these engines, heat-treated Nichrome steel was used for the piston rods, connecting rods, stub straps, pins and eccentric cranks. Pistons and crossheads were made of .40 carbon cast steel. In the 2-10-2 type engines, the weight of the

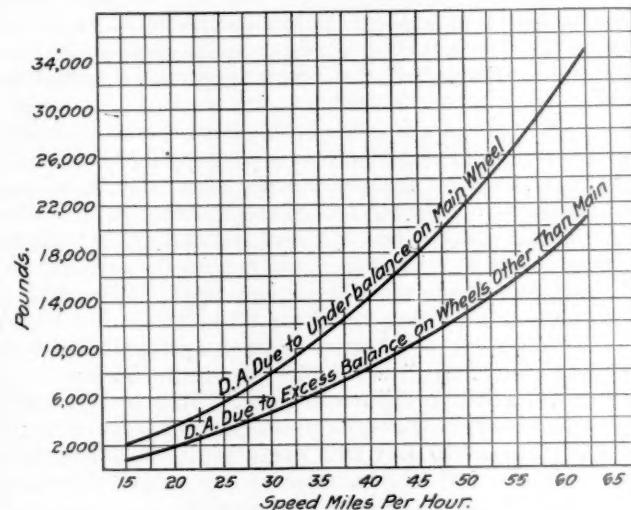


Fig. 2. Dynamic Augment in Wheels of a 2-10-2 Type Locomotive at Various Speeds

reciprocating parts was reduced 16 per cent. In addition, the weight of the revolving parts on the main pin were so reduced as to make it possible to omit counterweight bobs on the main axle. In previous sister engines with ordinary carbon steel parts, it had been necessary to follow such practice. A total saving in weight of 1,023 lb. per side was effected. The increase in the various calculated maximum stresses in the main and side rods as compared with the builders' standard practice for plain carbon steel averaged 21 per cent.

One of the most recent instances of utilizing higher tensile steels to lighten reciprocating parts is furnished by the powerful Pacifics built for the El Paso & Southwestern. For this purpose, heat-treated chrome-vanadium steel was specified for the main and side rods, piston rods, crank pins, eccentric cranks and crossheads. The engines had the following general proportions:

Boiler pressure	200 lb.
Total weight in working order	311,500 lb.
Weight on drivers	190,000 lb.
Cylinders	27 in. by 28 in.
Diameter of drivers	73 in.
Piston thrust	114,500 lb.
Weight of reciprocating parts	1,628 lb.
Piston thrust per pound reciprocating weight	71 lb.

By an increase in unit stresses of only 10 per cent as compared with the builders' standard practice for ordinary carbon steel, and by the use of hollow bored crank pins and piston rods, and a double bushing solid back end on the main rod, a total saving of 369 lb. per side, or 13 per cent of the weight of the parts affected, was obtained. Of this, 128 lb. was in the reciprocating parts. This meant 1,880 lb. reduction in the dynamic augment per wheel at 73 miles per hour.

In each of the above instances of weight reductions, heat-treated forgings have been the means selected for that end. But most roads lack equipment for heat-treatment. This has been the chief obstacle to the general adoption of heat-treated forgings. It operates particularly in repair work, where for any reason the forging has to be locally heated, thereby destroying the effect of the heat-treatment. The more simple a steel and the more simple its treatment, the better adapted it is to American railroad conditions.

To meet all the special conditions entering into locomotive design, construction and maintenance, the American Vanadium Company, about five years ago, developed a type of vanadium steel that without heat-treatment other than the usual simple annealing gives all the physical requirements for heat-treated (quenched and tempered) plain carbon steel. This steel, known as carbon-vanadium, is one of the simplest types of alloy steels, being a plain carbon steel with vanadium alone added.

Tests of solid driving axles 11 in. in diameter of this type of steel, annealed, gave the following physical properties:

Elastic limit, lb. per sq. in....	59,260	60,430
Tensile strength, lb. per sq. in....	88,270	92,520
Elongation in 2 in., per cent....	25.5	24.5
Reduction of area, per cent....	48.9	50.0

Compared with ordinary annealed carbon forgings, carbon-vanadium steel has over 25 per cent higher elastic limit, or useful strength. When higher physical properties

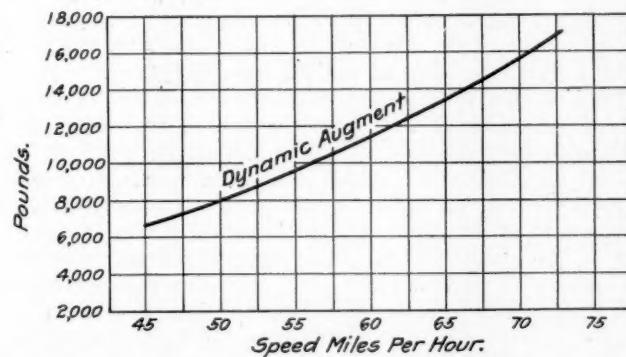


Fig. 3. Maximum Dynamic Augment in Wheels of a Pacific Type Locomotive

are desired than can be obtained by simple annealing, results can be obtained by heat-treatment that approximate those from the more complex alloy steels.

A study was recently made of the amount of weight that could be saved in the reciprocating and revolving parts through an increase in unit stresses over approved practice for plain carbon steel, equal in proportion to the increase in the minimum elastic limit of annealed carbon-vanadium steel as compared with plain carbon steel. Several representative heavy locomotives were selected for investigation. The builders' adopted practice for maximum allowable unit stresses for plain carbon steel was taken as the base; and new sections worked out, keeping within the limit of 25 per cent increase over these stresses.

Two of these locomotives were the ones for which the dynamic augment curves shown in Figs. 2 and 3 were plotted. In the case of the 2-10-2 type, the results show a reduction of 326 lb. in the weight of the revolving parts on the main pin. This would mean a reduction of 6,700 lb. in the present dynamic augment in the main wheel at a speed of 40 miles per hour, due to the existing lack of 691 lb. in the main counterweight. The above saving in weight, and the reduction of 296 lb. in the reciprocating parts gives a total reduction of 622 lb., or 155 lb. per wheel, in the excess balance that had to be added to the counterweights.

of the other wheels. This means a reduction of 3,200 lb. in the maximum rail pressure at 40 miles per hour on any one of these wheel points, assuming that all the weight saved in the reciprocating parts would be taken out of the counterweights.

By the use of vanadium cast steel for crossheads and pistons, or rolled steel pistons, and by special care in design, considerable additional weight reduction could be effected, probably 250 lb. at a very conservative estimate.

The total estimated saving in weight in the reciprocating and revolving parts through the modified designs is 921 lb. per side.

Apart from its relation to the dynamic augment, this weight taken out of the running gear could be added to the boiler. The above amount combined with what could be saved by using hollow bored axles of carbon-vanadium steel, would make it possible to add 1½ in. to 2 in. to the diameter of the boiler, without increasing the total weight of the engine.

In the case of the Pacific type locomotive, the results show a saving of 260 lb. in the weights of the piston rod and front end of main rod. This means 86 lb. reduction in the excess balance in the wheel counterweights, which would result in 3,900 lb. decrease in maximum rail pressure on a wheel point at diameter speed.

Piston thrust was taken as full boiler pressure times the area of the piston. The stresses were calculated by the formulae in use by the builders.

Extended piston rods were applied to both the 2-10-2 and Pacific type. In the modified designs the extensions are eliminated. The use of the ordinary piston rod with a piston having an extended wearing shoe is considered good practice and is rapidly supplanting the use of the extended rod. Hollow bored extended rods of the Pennsylvania type could be used with almost as much saving in weight.

Discussion

A number of members took part in the discussion. Marked advantages of the alloy and special steels in making it possible to reduce the weight of the parts, and thus the dynamic augment, were not questioned. James Partington, estimating engineer, American Locomotive Company, stated, however, that the use of these steels was not progressing as rapidly as the advantages seemed to warrant, because of the commercial and manufacturing conditions which confront the railways and the locomotive manufacturers. A number of months is now required for the delivery of the special heat treated parts and, even under normal conditions, a much longer time is required than for carbon steel forgings. This is a bad handicap when it is necessary to replace forgings, because of defects, in the erecting shop or in making regular running repairs. Mr. Strong, in replying to this criticism, suggested that the automobile manufacturers were using the alloy steels to the greatest possible advantage and that the difficulty in question could be overcome if the railroads would carry extra parts in stock.

W. E. Symons called special attention to the advantages of the four-cylinder compound locomotives in reducing the dynamic augment to a minimum. J. J. Yates, bridge engineer, Central of New Jersey, commented on the disastrous effect of an excessive dynamic augment upon the bridges and said that heavier wheel loads would be permissible in the proportion to which the dynamic augment could be reduced. The discussion also developed the fact that the high speed locomotives could be fairly well balanced but that the slow speed heavy freight engines were unbalanced to a very considerable degree because of the small diameter wheel and the fact that an adequate amount of contrabalance could not be provided. The use of the lighter parts would, of course, prove a very distinct advantage in such cases.

Joint Conference of Capital and Labor

IN THE COURSE of the reorganization of the Department of Labor, a joint conference committee, representing capital and employers on the one side and labor unions and employees on the other side, has been appointed to work in conjunction with Secretary of Labor Wilson. The National Industrial Conference Board has chosen the following to represent the employers:

Loval A. Osborne, New York, vice-president of the Westinghouse Electric & Manufacturing Company and chairman of the executive committee of the National Industrial Conference Board.

Charles F. Brooker, Ansonia, Conn., president of the American Brass Company.

W. J. Vandervoort, East Moline, Ill., president of the Root & Vandervoort Engineering Company.

L. F. Loree, New York, president of the Delaware & Hudson, chairman of the board and executive committee of the Kansas City Southern, president of the Hudson Coal Company, Northern Iron & Coal Company and Schuylkill Coal & Iron Company.

C. Edwin Michael, Roanoke, Va., president of the Virginia Bridge & Iron Company.

The American Federation of Labor has appointed the following as representatives of labor:

Frank J. Hayes, president of the United Mine Workers of America, Indianapolis, Ind.

William L. Hutcheson, president of the United Brotherhood of Carpenters and Joiners of America, Indianapolis, Ind.

J. A. Franklin, president of the Brotherhood of Boilermakers & Iron Shipbuilders of America, Kansas City, Kan.

Victor Olander, representative of the International Seamen's Union of America, Chicago.

T. A. Rickert, president of the United Garment Workers of America, Chicago.

These ten men are to choose two additional members as representatives of the public.

Secretary Wilson, in announcing the appointments of members of this committee, wrote them in part as follows:

"Agreements of members and policies, which would govern the relations between employers and workers during the war, will greatly facilitate the formulation of a national program and will contribute largely to a successful administration of that program."

Among the questions to be considered by the conference committee will be those dealing with the basis for wage determination, strikes and lockouts, piece work prices and

price fixing, means of eliminating improper restrictions on the output of war materials, methods of promptly adjusting disputes at their source through boards containing equal representation of employers and employees, etc.

The first meeting of the conference will be held at the office of Secretary Wilson, February 25.

Standardization of Purchases

HENRY WALTERS, chairman of the Atlantic Coast Line and the Louisville & Nashville, who is acting as special adviser to Director General McAdoo, is in charge of the studies being made for the purpose of establishing standard designs of cars and locomotives to be adopted by the railway administration. Mr. Walters has held numerous conferences with car and locomotive builders on the subject and expects to have several more before anything has been decided.

The committee on cars appointed last summer by the Council of National Defense, at the time when it was proposed to have the government buy freight cars for the railroads, has been delegated to investigate the question of freight car standards and a new committee on locomotive standards is to be appointed by Mr. McAdoo. The car committee consists of S. M. Vauclain, vice-president of the Baldwin Locomotive Works; W. H. Woodin, president of the American Car & Foundry Company; J. M. Hansen, president of the Standard Steel Car Company; N. S. Reeder, vice-president of the Pressed Steel Car Company and Clive Runnels, vice-president of the Pullman Company.

John Skelton Williams, director of the divisions of finance and of purchases, is to organize a staff of assistants which will be in the nature of a central purchasing board for the railway administration. Samuel Porcher, purchasing agent of the Pennsylvania Railroad, has been temporarily assigned as assistant to Mr. Williams to conduct a general investigation of the general subject of handling railroad purchases with a view to working out a plan, and other railroad officers will be called in to assist from time to time as occasion may require. It is understood that the administration intends to take charge of the purchase of cars, locomotives, rails, oil and other important items of railway supplies which are to be standardized, but it is not the present intention to take over all railway purchases and undoubtedly most kinds of supplies will continue to be purchased by individual railroads as at present. The extent to which the administration will take charge of railway purchases will depend largely on the result of the investigation.



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One of the Heavy Mounted Guns on the Western Front



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Using a Light Railway to Bring Up a Big Gun.

Mobilizing Intelligence on American Railways*

Labor Turn-Over Problem. Functions of the Corporation School. Vital Necessity of Such Schools

By Norman Collyer

Southern Pacific Company

THE RAILWAYS OF THE UNITED STATES engaged in interstate commerce employ about 1,800,000 persons. If we include interurban and street railways the number is increased to over two million. Now conceive, if you will, a great map of the United States on which each of these employees is represented by a tiny electric light. Some are moving along the familiar tangled lines indicating railway systems, but the greater number are stationary and grouped about the large terminals. Everywhere lights are being extinguished, sometimes by the death, more often by the resignation or discharge of an employee; and everywhere new lights are appearing as new employees are hired. Five times a minute, 300 times an hour, 7,200 times a day, employees are being lost and replaced. These figures are assumptions only, but they are conservative and probably far below the facts.

No one knows what the labor turn-over in the railroad industry amounts to, and as employment statistics are now kept—or rather, not kept—there is no way of getting at it. I base my data on the number of time vouchers issued by the Southern Pacific Company during a normal year, for although time vouchers are occasionally issued to persons not leaving the service, these rare instances are more than offset by those leaving the service who do not receive time vouchers. The avoidable cost of this labor turn-over likewise is unknown, but is certainly staggering in its magnitude. Probably \$40,000,000 a year would be too low an estimate. Magnus W. Alexander, of the General Electric Company, analyzed a group of 12 factories employing some 40,000 hands, and by certain reasonable and perfectly defensible assumptions proved that 22,031 employees were hired during the year 1912 in excess of their apparently necessary requirements at a cost of \$831,000, or an average of \$37.72 for breaking in each man hired. The Ford Motor Company by giving the subject attention reduced its labor turn-over from 400 per cent to 23 per cent; the Cleveland Foundry Company from 240 per cent to 125 per cent. These are special instances, cited merely to show that labor turn-over can be reduced and that in each case the diagnosis precedes the cure.

Let us consider what takes place when a new light appears upon our map—that is to say, when a new employee is hired. He wants the job, else he would not have taken it, but before he can make a beginning he must understand what is desired of him. He needs instruction. If he has some ingenuity and initiative, and especially if he can interpret his job in terms of previous experience, he is likely to attempt self-instruction—to experiment, “cut and try,” spoil his work, break his tools, and hurt himself or his fellow-workmen. After his task has been explained to him he will be awkward and forgetful, hence instruction needs to be repeated as training. Even when he clearly understands the requirements of his position he is apt to become lazy and careless unless checked up by constant supervision. But supervision alone is weak and ineffectual, and requires the backing of an adequate system of discipline. Whenever men are gathered together for any large undertaking, these four elements follow each other as surely as the phases of the moon—first *Instruction*, then *Training*, then *Supervision*, then *Discipline*.

Under the corporation school plan the beginner does not learn by self-instruction; nor by watching others and taking hold when he is allowed to; nor by the casual instruction of his associates, who are too indifferent, too busy, and too unskilled as teachers to make such instruction effective; nor by the competent but hurried and infrequent instruction of a foreman or supervisor whose time is more profitably occupied in directing the work of skilled employees. He learns by none of these methods, but is made ready for his work by acquainting him with its requirements and drilling him in its performance in an orderly, carefully preconceived manner, to the end that waste of time and effort may be eliminated.

The Corporation School

The purposes of corporation schools are three-fold: (1) to teach a particular task involving a short series of closely related duties, such as comptometer work, or the operation of a telephone switchboard; (2) to teach a trade, as in the case of mechanical apprenticeship systems, or schools for dining car chefs; (3) to teach subjects related to a task, a trade, or a business, thus presenting an opportunity through voluntary study to increase present efficiency or prepare for advancement.

The methods used vary with the purposes of the schools: We have the recitation method used by the Southern Pacific board of examiners on train rules, which is without doubt the oldest method used in any kind of school, dating back to the days of Greece and Rome; the lecture method, likewise a survival from the medieval period when books were scarce and their contents had to be dictated to the students; the supervised study method, popular in shop apprentice and telegraph schools; the laboratory method, which is the method of learning a thing by doing it—not necessarily in a laboratory, but wherever it is normally done; and the correspondence method, which is of special interest to railroad companies, whose employees work on such irregular hours and are scattered over such a vast territory that they can frequently be reached in no other way. It is quite possible that entirely new methods of instruction may be discovered, just as the correspondence method was invented about 25 years ago.

These different methods are applied in a great variety of ways: There are schools in which the employee spends all of his time in learning and is not expected to do any productive work whatever during the period of his training, as in the case of the educational trips given by the Southern Pacific to selected groups of ticket clerks, or a more recent and striking illustration—the Reserve Officers' Training Camps of the National Army; schools in which study and practice are blended, as in the Southern Pacific agency school; schools in which the employee's time is made as productive as possible, no related instruction being given on company time; and continuation schools, which as the name implies, are designed to afford the employee an opportunity to continue his general education under the company's guidance while earning a livelihood. These last may be maintained either by the company or by public or private institutions in co-operation with one or more corporations. The manufacturing industries of Fitchburg, Mass., Akron, Ohio, and

*Abstract of an address before the Pacific Railway Club, January 10, 1918.

Providence, R. I., have attained a degree of co-operation with public instruction that eclipses that of any railroad company I know of.

If we are to meet the needs of the future; if we are to maintain our roadway and equipment in a manner satisfactory to the Government; if we are to weather the present shortage of labor and survive the further loss of thousands of skilled workmen to ship-yards, factories and mills to the shops of the ordnance department, to the Governmental offices at Washington; above all, if we are to contribute our necessary and patriotic quota to the battle-fields of Europe—it must be through a better use of our man-power, a more intensive training of our employees. The corporation school offers a means through which this can be accomplished. It is past the experimental stage. Whatever your problem, be assured that some other corporation executive, somewhere, has met the same problem and tackled it. The fruits of his experience it is your duty to obtain. I am not so fatuous as to believe that the corporation school can whistle up employees where none are to be had, or that it is a panacea for all the labor troubles to which the harassed railway manager is heir; but it is a proven assistance in getting new men quickly into their stride and holding them in the service.

What Are You Doing?

"But," you exclaim with pride, "we already have a corporation school. Look at our mechanical apprentices—look at our airbrake instruction rooms—look at our office work schools."

Are you really doing these things, or are you merely going through the motions? Are you supervising your students, and are you supervising the supervisors to see that the students are not pulled off their studies and diverted to other work to meet the local convenience of a department? Are they getting the instruction and training which it was the intention they should get, or does the caption "student" or "apprentice" on the payroll satisfy you? Are you correlating your educational work with employment, safety and welfare activities? Are you developing and extending your educational work so that when once the employee has formed the habit of learning, it will follow him through his railroad career? Have you established relations with the educational institutions in your territory? Have you started such records as will enable your management to know at any time the results of your educational system, including particularly the failures and those who leave the service, so that their number may be reduced? Have you formed alumni associations where enough employees have completed formal training to justify them? Above all, have you adjusted your organization so that the graduates of your corporation schools, if competent, will have opportunity to do the work for which they were trained, at the full wage, with the support of their superiors, the respect of their fellows, and the loyalty of their subordinates? If not, you have not made even a beginning.

I claim no novelty in the ideas here advanced, for they have long been dwelt upon by gifted writers and eloquent speakers. Thirty years ago Dr. W. T. Barnard, assistant to the president of the Baltimore and Ohio, published an extensive report entitled "Technical Education in Industrial Pursuits, with Especial Reference to Railroad Service," which was widely circulated; and the plan for a railroad college proposed in 1887 by Walter G. Berg, chief engineer of the Lehigh Valley, caused considerable interest and comment in that year. Looking back from this distance, it appears that neither of these gentlemen realized the prime importance of making the training of railroad employees a function of the railroad itself, by, for, and within the railroad, rather than a detached activity perhaps to be supported by the railroad. At any rate, the Barnard plan, for which the directors of the Baltimore and Ohio had appropriated \$20,000

per annum, suddenly collapsed, and the Berg plan never got beyond the stage of discussion.

As early as 1898 the American Railway Master Mechanics' Association adopted a Recommended Code of Apprenticeship Rules, and in 1905, following the publication of Geo. M. Basford's historic paper before that association on "The Technical Education of Railroad Employees" re-awakened interest resulted in the establishment on a number of roads of mechanical apprenticeship systems designed along modern lines. Nor is this movement confined to the motive power department; the 1915 edition of the Manual of the American Railway Engineering Association, page 131, refers to methods of educating section foremen, and in fact in almost every department of the railroad industry there are examples of similar undertakings. Alas, the failures far outnumber the successes! Some were born of the enterprise of a single individual and perished when for one reason or another his support was withdrawn; some were founded upon incorrect principles and hence were predestined to failure; some were without provision for an adequate supply of new recruits, while others turned out graduates faster than positions could be found for them, causing a back-wash into the school with consequent discouragement and demoralization; many were started with good intention, but lacked definite educational program, competent instructors, well-defined policies—in short, their failure was a failure in management. All honor to the mechanical department of the Santa Fe, which instituted an apprenticeship system in 1907 and stuck to it! With 622 of its graduates in service, many in official positions, that road is reaping the benefits of its steadfast and progressive policy.

Vital Necessity of Corporation Schools

This problem, however, because of its importance transcends the boundaries of any one department; it affects all departments, and hence should command the attention of the highest executive officers. If you will allow me to revert to the subject of relations with public instruction, in which we are some twenty years behind the cash register, the rubber and the electric manufacturing industries, I shall give you an illustration. Would you, Mr. Purchasing Agent, enter into a contract to buy material from a concern the excellence of whose product you had grave reason to doubt? Would you place orders to the tune of three and one-half million dollars a year, waive inspection of material, accept whatever was offered you, and make no effort to get your money's worth? You would not—not if you expected to hold your job. And yet that is what you are all doing with respect to the public education system of California. In 1916 the railroads of this State paid in operative taxes \$7,151,583. Of this sum 51 per cent, or \$3,647,300, was used for purposes of public education. The boys and girls sent you from the public schools you take into your service, sometimes after a perfunctory mental examination, generally with none; you waive inspection, and then complain of the character of the material after it has reached you and been paid for.

How did the Southern Pacific engineers reduce rail failures per 100 miles of track from 31.10 in the first six months of 1911, to 5.16 in the same period of 1914? Not by standing idly by and deplored the product of the mills. They collected their data with respect to steel rail performance, decided which mills were the most reliable and which methods of manufacture gave the best results, then followed it up by sending their metallurgists and inspectors to the mills themselves to see that such methods were observed insofar as their own rails were concerned.

Where is the railroad that has tried to improve the product of the schools? The school-masters would resent your counsel as an intrusion, say you? From my own experience, I know they would welcome it. What are they working for, if not the usefulness, the success, and the material welfare

of their graduates? Are they not interested in what becomes of the twelfth part of their product that is normally destined for the railroad industry? Every school with which you establish helpful relations will then become a recruiting station for your lines, and you can get the cream of its output, if you will. I look forward to the time when representatives of the railroads will sit in the councils of the National Education Association, not as railroad men soliciting passenger business, but as educators charged with the training of an important fraction of the population of the United States. Such representation will require a broad vision of the needs of all departments, because public instruction is of necessity the common denominator of all forms of human industry—it is not intended to serve one industry alone, much less this or that department of a single industry.

It may perhaps be suggested that corporation schools are all very well for concerns under private management and control, but that the railroads, since they are for the time-being an arm of the Government, could not with propriety undertake to usurp the functions of another arm of the Government. The argument is fallacious, because education being a governmental function, should be assumed by whatever agency can best accomplish it. For 70 years the British Admiralty has maintained a splendid system of apprenticeship, from which selections are made through competitive examination for Keyham College, whence a still smaller number reach the Royal Naval College at Greenwich. The

Great Eastern Railway, the London & Northeastern Railway, and Great Western Railway of England have had educational systems nearly as long, and are not now so engrossed in the bitterness of war as to neglect them.

Certainly it costs money to train men properly—it takes equipment, furniture, tools, and plenty of instructors to develop them fast and make them productive as quickly as possible. It costs more money not to train them—it costs millions in accidents, injuries, broken tools, spoiled work, loss of their own time and of the time of foremen and others, careless habits allowed to go uncorrected, and the needless heavy labor turn-over. These vast sums may be buried in the accounts, but they are there, just the same.

Hasten the day of that American railroad whose vigorous and far-sighted management will give these questions the consideration they compel! They require time, patience, professional skill and managerial capacity of the highest order for their solution. We have in the railway men of America an army twice as large as the army which Xerxes marched down from the plains of Cappadocia, and which was, until the present war, the largest army in history. If this great army of railway men is to be counted among the resources of America, we must enlist their co-operation, train their muscles, energize their faculties, mobilize their intelligence, and unite their powers into one great organization that will be a determining factor in the patriotic enterprise of winning the war.

More Data Required on Transverse Fissures*

A Discussion of Some of the Conditions Surrounding the Development of This Form of Failure

By C. W. Gennett, Jr.

Manager, Rail Inspection Department, Robert W. Hunt & Co., Chicago.

SINCE THE LEHIGH VALLEY ACCIDENT transverse fissures have become a source of constant anxiety to railroad officials because such defects, only infrequently detected by the trackmen, may first appear under trains entirely without warning. The number of actual accidents resulting from rails containing fissures is no doubt a small part of the whole, but the large losses that have been directly attributable to fissures, coupled with the continual possibility of repetition creates an alarming situation that demands a full investigation of the cause of fissures apart from other types of rail failures. Mr. Howard's position gives him a field for action and opportunity for laboratory examination and research that is unsurpassed, and the results of his investigations must be received with the utmost attention and respect. His admirable paper, summarizing his previously published studies and analyses of the transverse fissure problem, constitutes a convincing treatment of the subject chiefly from the standpoint of stress and strain to which rails are subjected. The intricacies of the problem are so great that seemingly any theory advanced for the cause of fissures may be attacked from some angle; and although Mr. Howard's deductions are logical in the direction followed, there is the apparent necessity for considerable work along other lines before his theories can be fully accepted.

It is doubtless a generally conceded fact that fissures,

whether fundamentally due to fatigue or something else, are of a progressive character, their ultimate size being the result of growth from an originating nucleus or point of rupture. Abundant proof of this lies in the variable sizes of the fissures found, and there can be no doubt but that their development or growth is the result of the strains to which rails are subjected in the track. Obviously, therefore, the most important factor in investigating the cause for fissures lies in determining the conditions that exist at the point of original rupture, that is where the separation of the metal at the nucleus occurs. The composition of the steel chemically and structurally in this small area thus becomes of vital interest, and it is not sufficient to place too much credence in the manifestation of the good conditions that may be found elsewhere in the sample under investigation. The inferior conditions that may be present not only at the original point of rupture, but at other places, are manifold and minute, and examination of them requires careful and skilful work by trained metallurgists and microscopic observers. Absence of results of critical examinations of various specimens in many of Mr. Howard's government reports, including his present paper, is surprising and disappointing and does not carry conviction to the statement that "Critical examinations have shown transverse fissures to have their origin in metal microscopically sound and normal in structure." In fact, the results of some chemical analyses of steel containing transverse fissures that have been reported are such as to direct suspicion quickly to the quality and consequent structure of the steel and that "Neither chemical analysis nor microscopic examinations

*A discussion of a paper on Transverse Fissures by James E. Howard, engineer-physicist of the Interstate Commerce Commission, which was presented before the American Institute of Mining Engineers at New York this week. Mr. Howard's paper was published in the *Railway Age Gazette* of November 30, 1917, page 997.

have shown a definite cause for the development of transverse fissures" is due perhaps to insufficient chemical and microscopic work having been done to permit establishing such connection. The question is whether Mr. Howard's studies have been directed along certain metallurgical lines far enough to justify beyond argument those statements of his which plainly eliminate the chemical and physical condition of the steel from any responsibility regarding the origin of fissures.

Several reports have been issued by the Interstate Commerce Commission giving the results of Mr. Howard's work in connection with accidents caused by transverse fissures. The following table gives the average results of the various chemical analyses made on rails containing fissures mentioned in those reports.

Rail	C	Mn	P	S	Si	Ni	Cr
A	.843	1.20	.042	.032	...	...	...
B	.86	.67	.050	.033	.016	...	...
C	.69	.79	.095	.025	.005	...	...
D	.83	.79	.062	.041	.165	.066*	.05
E	.84	.79	.059	.040	.152	.28	.02
F	.801	.91	.015	.041	.125	...	...
G	.71	.77	.121	.030	.003	...	...

*Probably incorrect.

None of the above rails, possibly excepting "F," are acceptable under the requirements governing the chemical composition laid down by recognized specifications for rail steel. The "slender deficiency" by which most of these steels fail to fulfill common rail specifications is not apparent and although "it is not always clear that the most suitable steel for the purpose is asked for in specifications" (probably meaning rail specifications) still the burden of thought is largely against the advisability of using steel of the hardness and brittleness indicated by the above. That such steels have been accepted and put into track, of course unknowingly and in spite of the specifications, is a criticism of the methods of procedure and by no means a defense for that steel when later fracture occurs.

Aside from being chemically defective in a general sense for use in rails, the above steels offer other significant features for consideration. High carbon coupled with high phosphorus makes a hard non-ductile steel to start with, but the effect that large amounts of these elements, singly or together, may have in small local areas deserves study. Further, the low amount of silicon in some of the steel above mentioned indicates the liberal use of aluminum at the time the steel was cast into ingots. Large amounts of aluminum added to steel, especially in the molds, has often been regarded as of doubtful practice, while the resulting presence of alumina in soft steel has been identified and the good qualities of the steel questioned. Recently alumina has been microscopically found in rail steel, and incidentally in rails containing transverse fissures.

Basic open hearth steel such as used for rails is easily subject to the many vicissitudes of heat treatment; in fact, rails are virtually heat treated by the action they undergo when cooling on the hot beds. The influence there of cold winds and contact with the cold skid rails may be marked. Some effects of unusual heat treatment may be and doubtless are confined to short longitudinal lengths of rail, and it is almost inconceivable that austenite or cementite does not exist locally in many cases. The presence therefore of distinctly non-ductile localities or regions is plainly predicated. All rails containing these hard spots caused by either chemical or physical conditions must be subjected, of course, to the damaging blows of the straightening presses long before they ever reach the track and apparently opportunity is thus offered for interior injury to occur.

Slag inclusions are held responsible by Mr. Howard for the chief type of rail failures, i.e., those known as split heads, the theory being that the inclusions are elongated in the process of rolling and become streaks in the metal, which are unable to resist the shearing action of the traffic later.

But hard spots of a non-ductile character, originating perhaps from chemical causes or possibly minute globules of a distinctly foreign nature or the physical effects produced by the methods by which rails are cooled, are not regarded as menacing the integrity of the metal, merely because the presence of such conditions has not been even perfunctorily identified in the rails examined notwithstanding the indications, and the definite proof of their existence in certain other cases.

Thus it seems inconsistent now to attribute the cause of fissures to a type of purely fatigue fracture for which wheel loads are mostly responsible and the suggestion is advanced that as further microscopic work proceeds the effects of somins, non-ductile spots and chemically unsuited steel for the purpose used may be more fully established, while in the meantime the situation emphatically warrants a suspension of judgment until these painstaking studies can be made.

It seems regrettable that with a subject as important as that of transverse fissures no particular effort has been made to accumulate systematically the important historical data pertaining to the various cases. Obviously this is a work for the American Railway Engineering Association whose engineer of tests should have a complete index of the different cases with such information on each as would render unnecessary the need for dealing with generalities now so often the case. Such cataloging of the fissures that have occurred should show as accurately as possible among other things:

1. Name of manufacturer and railroad.
2. Dates of rolling and occurrence.
3. Heat number and chemical analyses (complete).
4. Location of rail in the ingot (and if possible the ingot in the heat).
5. Location of the fissure in the rail with respect to the branded side of the rail.
6. Location of the fissure in the rail with respect to the track gage side of the rail.
7. Was rail on high or low side of curved or straight track.

With the results of such tabulation covering a large number of cases the study of certain matters concerning fissures could be much better approached than now when comparatively few rather isolated cases must often be considered.

LOAN AUTHORIZED FOR RAILWAY CONSTRUCTION IN PERU.—Commercial Attaché William F. Montavon at Lima, under date of January 15, reports that a bill passed by the Peruvian Senate authorizes the government of Peru to contract with the Banco Italiano, of Lima, for a loan amounting to 3,000,000 soles (\$1,500,000) to be employed in the construction of a narrow-gage railway connecting the present line of the Central Railway of Peru with the coal fields of Jatunhuasi. The loan is to bear an interest of 7 per cent and an amortization of 1 per cent. The term of maturity is not fixed in the bill.

TRADE OPPORTUNITIES IN SERBIA.—At a luncheon given by the Council of the British Engineers' Association to the members of the Serbian Industrial Mission in London on January 21, some interesting speeches were delivered, in the course of which mention was made of the many excellent opportunities for trade which would present themselves in Serbia at the conclusion of the war, particularly in connection with the reorganization of railway and river communications. Mr. Doushan Tomich, secretary of the Serbian Industrial Chambers, said that Serbia is very rich in raw materials, which had hitherto been developed by the Central Powers, and that in order to develop these, Serbia required machinery, tools, locomotives, electrical apparatus and other supplies. The suggestion was made by Sir Alfred Stokes, of Ransomes & Rapier, Ltd., that after the war Serbia would want railways and that England must be prepared to equip and finance them.

General News Department

Two passengers were killed and four seriously injured in a derailment of a Chicago, Burlington & Quincy passenger train near Curtis, Neb., on February 19.

J. Rothschild, has been made secretary of the American Association of Railroad Superintendents, succeeding E. H. Harman, who resigned in December when he was appointed superintendent of the Wiggins Ferry Company. Mr. Rothschild's office is at room 305, Union Station, St. Louis, Mo.

"Safe Practices" in the management of shafting, couplings, pulleys and gearing is the title of the National Safety Council's illustrated Pamphlet No. 8, which has just been issued. It consists of eight pages and the price is 10 cents. No. 9 deals with engine guarding and engine stops, automatic governors, etc., 16 pages; No. 10 is on oiling devices and oilers, eight pages. All of these are to be had from W. H. Cameron, general manager, National Safety Council, Chicago.

The Nevada-California-Oregon, south of Hackstaff, Cal., is now operated by the Western Pacific, the contract having gone into effect on January 30. This portion of the road includes the main line from Hackstaff, southward, to Reno, Nev., 65 miles, and the line from Plumas Junction, Cal., to Davies Mill, 40 miles. A large part of this mileage lies parallel to the main line of the Western Pacific. This arrangement leaves in the hands of the officers of the N.-C.-O., 171 miles, Hackstaff northward to Lakeview.

On the Great Western Railway of England there are torpedo-placing machines at over 1,500 signal cabins; and about one-third of these have been installed during the past year. This statement is found in the annual report of the signal department of the road. This report says that 13 additional signal cabins were put in use during the year and the total number of working levers now is 46,857, an increase of 603 during the year. These new installations have been made necessary by the establishment of government manufacturers, etc.

Jacob M. Dickinson, former receiver of the Chicago, Rock Island & Pacific and Secretary of War in President Taft's cabinet, is the head of a new law firm recently organized in Chicago. The new firm of Dickinson, Wetten & Keehn will include Jacob M. Dickinson and his son, J. M. Dickinson, Jr., Emil C. Wetten, Roy D. Keehn, William J. Matthews, Arthur J. Eddy, and C. H. Pegler. Mr. Pegler having previously been general counsel of the Aurora, Elgin & Chicago, is now the acting manager during the absence of the general manager in Washington on special war duty.

The shopmen of the Grand Trunk are to have a general increase in pay, aggregating it is said, more than \$500,000 on all of the company's lines. The advance is in accordance with the decision of a board of conciliation which has recently made a unanimous report. The men affected are the machinists, the boilermakers and the blacksmiths, said to be about 1,300 men in all. The report also provides that grievance committees shall be established in the shops; the working day is to be 9 hours and the rate of pay is to be advanced 50 per cent for overtime and for work done on holidays. The agreement runs one year from the first of March.

The state of New Jersey has taken action looking to the construction of a bridge across the Delaware river between Camden and Philadelphia, and a tunnel across the Hudson between Jersey City and New York; this in the shape of three laws, approved by the Governor on February 14, looking to the appointment of a commission, the preparation of preliminary estimates, and providing for a tax to cover that part of the cost of the two projects, which, in the opinion of the legislature, should be borne by New Jersey. The commission called for by these laws will consist of eight members, to serve without compensation; and this body will be expected

to make the necessary arrangements with the officers of the states of New York and Pennsylvania.

The urgent deficiency appropriation bill, to supply deficiencies in the appropriations for the fiscal year ending June 30, 1918, as reported to the lower House of Congress on February 14, carries an item of \$125,000,000 for transportation of the army and its supplies. It also contains an appropriation of \$100,000,000, asked by Major General Goethals, acting quartermaster general, for a chain of quartermaster storehouses at the seaboard and at interior points to be used for army supplies. It is proposed to spend \$23,000,000 on storehouses at Norfolk, Va.; \$16,500,000 at Charleston, S. C.; \$12,970,000 at Philadelphia, \$10,700,000 at Boston, and other sums in the vicinity of New York. The gulf ports have not been included because of the long additional voyage to Europe.

Promptness in extinguishing fires by employees of the Pennsylvania Railroad is the salient point in an annual review by the insurance department of the company which has just been issued. By extinguishing fires before the arrival of the public fire companies they saved last year \$10,445,196 worth of company property. Altogether 334 fires were thus put out. The total loss sustained was only \$12,575. The total fire loss of the Pennsylvania Railroad System (east and west) including those cases in which the public fire companies responded, was \$306,465, showing the very low loss ratio of 8 1/2 c. for each \$100 of value at risk. The regularly organized fire brigades extinguished 66 fires, at which the loss was less than \$59 per fire. Chemical extinguishers checked 30 fires, resulting in a total loss of \$630 on property worth \$197,156. Fire pails were used 53 times to extinguish fires on property worth \$664,622, at a loss of \$1,292. Locomotive fire apparatus was used in 19 fires in which the combined loss was \$1,176, the property threatened being valued at \$332,420. Fire hose was used 18 times, and chemical engines proved their value in four fires. Sand pails, extinguishers and tug boats were utilized in putting out other fires. By following the general instructions given, the employees of the company, without the aid of apparatus, extinguished 107 fires at a total loss of \$2,064 on property worth \$355,590. Fifty-one fires were due to causes wholly beyond the control of the company or the employees.

Examination of Railroad Improvement Plans

Director General McAdoo has appointed a committee consisting of Francis Lee Stuart, chairman of the port terminals committee of the Council of National Defense; A. T. Hardin, vice-president and chief engineer of the New York Central; A. C. Shand, chief engineer of the Pennsylvania; and H. A. Lane, chief engineer of the Baltimore & Ohio, to go over the budgets of desired expenditures for improvements for the eastern railroads which are being filed, at Mr. McAdoo's request, and to make recommendations to him.

Charge of Sabotage Denied

At its regular quarterly meeting on February 12, the Cincinnati Railway Club passed a resolution refuting the imputation that the railroads of this country are not doing their full duty in supporting the government in the war emergency. The resolution was passed after spirited addresses by Hon. Judson Harmon and Col. Brent Arnold. Judge Harmon paid an eloquent tribute to the loyal support given by the roads to the President in the stupendous work of prosecuting the war, and Col. Arnold declared that charges to the effect that the roads were attempting to hamper the administration were unjust and untrue and calculated to do injury to an industry which has been particularly conscientious in its efforts to promote the war program of the nation.

RAILWAY AGE

— AND EXPENSES OF RAILWAYS

2 December, 1917

Indiana Higher _____ Series June 1, 1917.

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF DECEMBER, 1917—Continued

Name of road.	Average mileage operated during period.		Operating revenues		Maintenance of way and structures.		Maintenance of equipment.		Operating expenses		Operating ratio.	Net from railway operation.	Railway tax accruals.	Operating income (or loss).	Increase (or decrease) comp. with last year.
	Freight.	Passenger.	(inc. misc.)	Total.	Traffic.	Trans- portation.	General.	Total.	General.	Total.					
International & Great Northern.	316	\$798,941	\$2,160,865	\$3,022,797	\$181,981	\$22,236	\$45,554	\$38,612	\$83,797	\$66,12	\$427,268	\$23,296	\$403,455	\$155,574	
Kan. City, Mex. & Orient.	272	96,219	13,979	142,235	5,098	52,911	6,128	108,583	93,77	7,210	7,007	202	1,441	—1,441	
Kan. City, Mex. of Tex.	465	93,261	16,303	130,338	4,035	55,333	4,854	103,398	89,64	11,939	4,832	7,108	1,343	—1,343	
Kansas City Southern.	755	768,382	1,072,302	1,835,494	172,932	22,563	40,324	43,670	72,342	67,75	55,939	85,659	264,782	24,893	
Lake Erie & Western.	900	535,988	57,269	622,956	83,642	148,033	30,275	322,535	21,864	43,485	70,54	183,501	60,552	122,905	—68,387
Lehigh & Hudson River.	96	146,505	4,376	158,315	21,360	32,066	1,474	65,50	7,201	127,660	80,63	16,000	14,654	—33,208	
Lening & New England.	297	297,436	83,448	380,884	1,326,523	1,254,037	50,277	2,549	104,226	9,819	66,299	85,406	52,212	—46,952	
Long Island & Salt Lake.	398	355,179	1,134,488	1,489,667	59,953	318,491	12,283	784,334	38,206	1,227,585	92,54	784,432	98,938	20,503	—184,380
Louisiana & Arkansas.	1,154	747,114	20,922	1,133,860	120,922	164,762	36,019	80,970	21,666	660,412	58,24	473,448	104,553	368,888	23,870
Ia. Ry. & Nav. Co.	302	91,271	46,061	142,794	25,833	21,716	4,294	50,541	4,862	107,247	75,10	35,547	7,437	28,110	8,954
Min. Range Louis.	342	160,617	78,980	251,1534	26,531	20,673	4,853	75,442	38,206	99,976	88,85	125,421	108,237	1,589,936	447,965
Louisville, Henderson & St. Louis.	199	127,448	5,564	191,913	54,511	1,125,183	138,790	203,073	15,116	602,725	97,611	1,698,783	102,227	—35,455	
Maine Central.	1,216	697,476	336,460	1,021,936	4,727,153	4,727,093	50,092	80,692	82,669	2,039,122	78,33	1,640,604	424,519	82,912	
Michigan Central.	568	1,130,271	25,372	1,133,860	28,370	54,652	105,430	9,928	203,111	59,235	128,573	8,773	119,801	196,817	
Midland Valley.	386	2,919,170	1,240,513	4,227,003	127,781	1,781	1,401	3,209	4,643	1,072,292	79,25	280,111	12,841	—16,665	
Missouri, Kansas & Texas System.	3,869	2,635,953	1,339,173	4,318,761	462,278	851,654	63,073	1,688,557	113,166	3,203,831	74,18	1,141,974	202,738	911,536	
Mo., Okla. & Gulf of Tex.	9	22,531	1,094	23,838	61,765	1,251	897	3,601	646	7,159	6,111	—1,023	7,134	—28,948	
Mississippi, St. Paul & Sault Ste. Marie.	1,646	796,181	178,323	1,030,697	2,580,086	288,558	349,812	44,922	1,262,581	64,666	430,665	47,982	382,227	1,030,697	
Missouri, North Arkansas.	1,365	59,414	42,092	109,609	1,315,865	1,315,899	12,401	35,494	40,340	4,756	50,936	82,46	12,822	83,474	
Missouri, Kansas & Texas System.	1,236	849,533	40,655	1,352,899	12,413	252,163	54,254	59,043	40,325	10,292	280,111	12,841	—16,665		
Nevada Northern.	165	213,677	18,699	235,894	18,621	31,428	857	51,242	5,837	106,299	45,198	127,613	8,900	118,707	
New Orleans & North Eastern.	203	343,876	1,047,355	1,494,231	61,289	39,975	3,932	461,955	38,184	840,086	80,26	16,678	184	16,495	
New York, Chicago & St. Louis.	571	1,131,701	1,297,373	1,429,573	1,171,277	19,176	4,286	1,678	65,523	133,884	78,17	37,383	97,72	169,923	
New York, Ontario & Western.	568	485,498	103,396	688,248	266,533	42,648	5,367	103,480	4,756	172,292	57,26	128,573	8,773	196,817	
New York, Philadelphia & Norfolk.	112	281,191	101,363	431,468	103,967	10,752	228,884	10,946	406,271	94,16	205,197	26,962	—1,765	—106,940	
New York, Susquehanna & Western.	135	281,232	55,720	242,337	12,865	61,636	2,499	204,888	6,724	278,618	114,97	36,281	2,324	—12,336	
North & Western.	2,086	4,313,068	773,919	5,376,765	463,103	92,039	71,442	1,995,811	116,835	359,959	67,72	1,754,806	47,982	417,837	
Northwestern Pacific.	507	216,135	406,215	59,661	460,215	47,388	4,946	150,417	9,581	272,297	67,15	133,488	24,253	53,072	
Panhandle & Santa Fe.	709	400,381	1,12,696	537,794	100,785	104,149	4,095	189,107	16,455	415,344	77,23	122,450	128,550	—195,143	
Pennsylvania Company.	1,754	3,845,433	1,249,039	5,749,152	1,112,681	5,752	90,921	3,034,864	90,921	173,452	101,214	—70,036	374,280	952,121	
Pennsylvania Railroad.	4,542	12,086,197	4,996,717	19,135,878	5,136,138	5,136,138	545,566	17,440,563	545,566	1,695,315	92,14	444,352	1,281,320	—2,380,803	
Pete Marquette.	2,245	1,480,224	333,144	1,97,155	165,801	387,674	26,420	904,755	56,867	1,538,731	77,72	440,844	42,556	398,567	
Philadelphia, Baltimore & Washington.	746	1,216,243	3,177,555	3,177,474	200,311	572,437	39,081	1,265,234	60,292	1,617,519	68,31	1,005,240	382,437	622,788	
Pittsburgh, Cincinnati, Chic. & St. Louis.	2,398	3,775,119	1,404,425	731,635	1,389,856	88,341	2,754,900	152,124	1,681,667	88,51	670,658	32,267	377,162		
Rutland.	415	165,938	110,311	325,595	16,328	63,348	9,960	180,100	10,793	1,519,566	86,50	43,928	11,660	—954,340	
St. Jos. & Grd. Island.	257	157,125	29,791	200,693	76,239	25,571	3,057	75,737	7,856	193,588	96,43	21,444	7,115	—84,275	
L. B. & Mexico.	548	363,280	104,334	39,607	52,300	43,376	11,251	154,261	22,427	234,371	57,14	168,237	77,107	—73,499	
St. L. M. Bridge Terminal.	9	618	248,481	12,590	4,409	921	6,240	154,921	17,783	178,337	71,77	20,671	49,454	7,227	
St. Louis-San Fran. & Tex.	143	40,231	255,327	70,837	26,108	2,202	54,002	3,904	97,735	137,97	—26,898	1,375	—28,223	—61,288	
San Ant. & Aran. Pass.	732	311,037	437,937	50,968	55,545	51,562	7,679	100,888	13,244	318,289	126,728	31,464	87,355	23,488	
Seaboard.	3,461	1,635,560	919,560	2,837,494	188,848	525,998	82,926	1,177,123	171,583	2,164,733	162,728	132,793	53,933	—23,488	
Southern in Mississippi.	6,982	4,576,986	3,013,279	8,399,507	112,703	1,396,738	155,198	3,151,823	199,120	5,029,381	59,87	3,370,126	409,549	2,958,060	
Sou. Pac.	278	66,517	3,075,279	8,782	2,159	51,960	5,113	75,117	48,777	178,890	65,536	32,266	24,317	26,443	
Tennessee Central.	292	57,926	38,591	141,892	13,204	26,879	4,579	6,887	121,602	84,55	85,728	20,339	18,425	16,344	
Terminal R. R. Assn. of St. Louis.	36	85,363	2,768	50,969	11,932	4,349	5,121	18,76	121,627	20,731	3,991	14,924	18,425	—98,795	
Texarkana & Ft. Smith.	81	1,562,394	727,446	2,441,771	—9,991	289,782	39,456	932,439	6,333,386	54,60	1,108,385	135,050	97,530	326,549	
Texas & Pacific.	1,946	2,164,544	727,446	12,294,533	12,294,503	1,201,177	1,509,973	168,746	6,740,173	274,700	10,082,334	43,97	2,205,119	380,456	1,820,661
Toledo, Peoria & Western.	247	66,441	34,080	107,482	14,306	40,169	1,984	49,013	4,216	109,688	102,05	—2,207	22,002	—52,028	
Tulsa & Del. R. R.	455	428,412	59,823	516,112	93,701	109,211	17,243	225,791	44,334	37,791	88,53	59,167	46,100	13,063	
Union R. R. of Baltimore.	128	35,527	14,295	64,020	8,699	11,221	827	225,233	9,703	279,372	2,234	7,192	12,523	—9,475	
Union R. R. of Penna.	35	99,122	58,713	11,912	3,035	3,157	2,159	—536	5,121	5,637	54,247	14,924	14,633	—154,056	
Vicksburg, Shreveport & Pacific.	171	112,872	88,807	225,693	6,959	36,688	4,972	57,720	6,109	6,888	113,323	50,21	112,370	—151,301	
Virginia.	2,519	2,25,050	727,446	12,294,533	3,282,330	329,157	47,613	77,948	1,549,949	2,577,162	78,51	202,284	62,500	23	

REVENUES AND EXPENSES OF RAILWAYS

CALENDAR YEAR 1917

Name of road.	Average mileage operated during period.			Operating revenues			Operating expenses			Net income from railway operation.	Operating ratio.	Railway tax accts.	Operating income (or loss) comp. with last year.		
	Freight.	Passenger. (inc. misc.)	Total.	Maintenance of Way and structures.	Maintenance of Equipment.	Traffic.	Transportation.	General.	Total.						
Alabama & Vieburg.	142	4,889,079	2,139,316	\$2,533,693	\$2,151,752	\$61,589	\$725,148	\$75,353	\$1,501,242	\$78,949	348,678	\$198,997	\$348,678		
Alabama Great Southern.	295	2,380,540	551,003	636,853	1,466,266	196,644	2,261,268	146,058	4,734,410	379,780	2,036,543	75,366	2,036,543		
Ann Arbor & W. Point.	93	879,580	664,620	285,611	477,043	76,034	1,430,228	109,422	2,384,889	75,97	754,054	55,277	55,277		
Atlanta, Birmingham & Atlantic.	640	2,131,197	3,600,252	294,213	77,120	598,444	1,241,228	63,286	1,241,228	70,11	529,022	50,026	50,026		
Atlantic Coast Line.	166	1,365,857	304,281	1,858,904	498,228	53,016	1,343,427	83,774	2,392,406	128,69	533,502	432,710	432,710		
Baltimore & Ohio Chicago Terminal.	79	11,576,866	44,061,033	4,891,462	7,002,226	1,029,037	1,289,123	89,918	1,289,123	147,597	1,289,336	12,013,742	12,013,742		
Baltimore, Chesapeake & Atlantic.	87	800,017	414,905	1,940,033	217,519	381,037	1,211,107	32,476	1,173,327	103,31	64,361	28,200	28,200		
Bangor & Aroostook.	632	3,285,354	856,867	632,473	746,296	49,765	1,364,173	149,536	1,299,368	61,56	1,254,28	318,129	318,129		
Belt Ry. Co. of Chicago.	31	11,695,359	393,463	12,372,619	1,478,399	551,734	1,443,359	3,944,486	2,61,141	6,622,234	2,264,000	12,013,742	12,013,742		
Bessmer & Lake Erie.	206	11,237,333	3,351,394	3,699,079	407,859	15,484	494,335	42,565	1,339,771	39,707	10,624	1,289,116	1,289,116		
Bingham & Garfield.	36	2,380,809	1,201,530	1,201,530	2,380,809	2,380,809	9,810	587,563	54,840	1,161,822	79,05	324,134	94,681	94,681	
Birmingham Southern.	44	884,058	73,987	1,783,856	227,894	509,492	217,894	62,471	83,703	1,411,722	62,000	1,394,193	189,887	189,887	
Buff. & Susq. R. Corp.	252	1,680,420	4,384,867	84,522	329,034	16,554	1,289,123	16,291,123	68,20	1,299,368	1,299,368	1,299,368	1,299,368		
Buffalo, Rochester & Pittsburgh.	233	1,947,993	338,894	2,424,739	465,161	1,043	1,166,055	61,183	1,229,433	87,82	1,229,433	2,070,843	2,070,843		
Canadian Pacific Lines in Maine.	282	3,662,142	302,342	4,063,267	405,534	634,162	197,248	935,25	165,641	1,339,597	57,43	1,229,670	1,229,670		
Carolina, Clinchfield & Ohio of S. C.	18	1,194,267	19,746	222,123	20,636	1,211	30,732	50,645	1,338,382	52,54	1,085,415	1,193,445	1,193,445		
Cent. of N. J.	684	27,102,319	6,922,156	37,096,739	31,090,101	6,686,133	369,757	15,240,891	801,547	26,412,853	71,19	10,683,887	2,386,878	2,386,878	
Charleston & Western Carolina.	352	11,119,838	1,313,594	14,975,000	1,454,770	4,043,988	191,533	5,813,030	1,285,683	2,786,632	73,21	1,019,316	160,023	160,023	
Chicago & E. I. & E.	1,052	14,240,232	4,893,287	2,424,739	465,161	1,043	1,166,055	61,183	1,229,433	87,82	1,229,433	2,070,843	2,070,843		
Chicago & Erie.	1,131	15,876,935	3,446,856	21,012,619	2,102,578	3,120,561	1,211	30,732	50,645	1,338,382	52,54	1,085,415	1,193,445	1,193,445	
Chicago & Rock Island & Pacific.	269	7,906,445	587,875	8,794,338	829,628	1,156,621	2,33,451	233,451	2,177,688	2,306,507	78,58,989	72,74	29,505,995	5,677,495	5,677,495
Chicago, Det. & Can. Grt. Tri. Jet.	60	37,158,024	1,305,346	12,401,443	305,346	282,719	52,599	841,616	45,981	1,527,928	63,62	873,317	115,296	115,296	
Chicago Great Western.	112	4,161,718	2,401,718	2,401,718	2,401,718	2,401,718	4,375,493	4,375,493	4,747,484	7,74,72	1,234,159	1,234,159	1,234,159	1,234,159	
Chicago Junction & St. Paul.	10,256	79,572,271	21,329,946	11,329,946	11,329,946	11,329,946	2,295,000	2,295,000	2,295,000	2,295,000	2,295,000	1,234,159	1,234,159	1,234,159	
Chicago, Peoria & St. Louis.	255	1,799,412	288,534	2,192,288	2,192,288	2,192,288	2,192,288	2,192,288	2,192,288	2,192,288	2,192,288	1,234,159	1,234,159	1,234,159	
Chicago, Rock Island & Gulf.	475	2,592,773	851,304	3,899,173	85,709,549	1,643,444	122,625	1,280,541	110,966	2,557,014	65,57	1,234,159	1,234,159	1,234,159	
Coal & Coke.	7,744	50,897,300	22,444,783	85,709,549	10,378,114	1,643,444	1,622,487	32,604,059	2,255,540	1,280,541	70,47	2,234,459	1,234,159	1,234,159	
Colorado, Rock Island & Pacific.	347	1,002,404	234,249	1,290,665	252,043	1,038,383	160,644	1,452,442	32,604,059	1,280,541	70,47	2,234,459	1,234,159	1,234,159	
Colorado, Midland & Colorado, Sugs.	337	1,008,724	2,244,783	2,476,500	2,481,820	3,016,674	344,106	9,779,431	544,336	1,280,541	80,57	1,234,159	1,234,159	1,234,159	
Cripple Creek & Colorado Valley.	89	914,588	1,113,169	1,113,169	1,113,169	1,113,169	89,849	89,849	95,385	1,280,541	67,73	2,234,459	1,234,159	1,234,159	
Cumberland Valley.	163	3,895,173	717,533	4,838,904	313,089	438,920	2,995,286	347,345	249,038	2,897,904	88,86	363,077	6,517,212	6,517,212	
Detroit & Toledo Shore Line.	878	25,322,988	3,020,185	29,935,653	2,501,166	6,654,710	1,072,049	1,072,049	1,072,049	1,072,049	1,072,049	87,781	401,021	91,769	
Delaware, Lackawanna & Western.	955	41,767,706	9,289,838	11,211,224	1,514,994	9,289,838	948,918	1,271,020	1,271,020	1,271,020	1,271,020	1,271,020	187,171	187,171	
Denver & Rio Grande.	2,580	21,869,383	4,735,517	28,433,138	3,563,297	48,922	1,242,488	50,97	50,97	50,97	1,242,488	61,18	1,242,488	1,242,488	
Denver & Wyoming.	337	1,008,253	1,008,253	1,101,932	252,710	204,020	17,250	1,213,165	1,213,165	1,213,165	1,213,165	1,213,165	47,465	47,465	
Detroit, Mississ. & Northern.	13,711	14,015,621	401,533	1,798,367	1,798,367	1,798,367	1,798,367	1,798,367	1,798,367	1,798,367	1,798,367	1,798,367	42,022	42,022	
Detroit, South Shore & Atlantic.	607	2,940,667	1,055,323	4,316,925	779,974	554,981	91,228	1,860,561	114,606	1,525,572	79,98	863,723	112,908	112,908	
Duluth, South & Atlantic.	175	1,685,639	289,777	2,026,109	1,01,176	142,734	217,500	571,080	1,280,541	1,280,541	1,280,541	1,280,541	1,280,541	1,280,541	
Duluth, Winona & Pacific.	802	14,622,696	146,196	1,416,474	3,522,154	100,774	6,654,710	1,997,216	1,997,216	1,997,216	1,997,216	1,997,216	1,997,216	1,997,216	
Elgin, Joliet & Eastern.	1,028	2,140,841	2,350,791	13,643,863	1,258,632	1,633,177	249,781	1,280,541	1,280,541	1,280,541	1,280,541	1,280,541	1,280,541	1,280,541	
El Paso & Southwestern.	765	4,292,809	9,899,483	70,982,219	8,101,167	6,666,676	17,600,715	1,158,557	33,357,263	1,081,187	85,68	2,377,819	7,767,755	7,767,755	
Florida East Coast.	1,987	53,764,725	2,588,027	1,09,456	1,030,352	1,030,352	107,134	2,482,408	193,333	1,280,541	55,29	3,638,927	2,301,354	2,301,354	
Gulf, Mobile & Northern.	13	12,444,457	3,740,667	17,285,640	3,230,906	3,230,906	3,230,906	3,230,906	3,230,906	3,230,906	3,230,906	1,280,541	1,280,541	1,280,541	
Gulf, Colorado & Santa Fe.	402	1,824,430	1,823,234	2,983,428	398,817	646,515	87,948	1,083,339	115,768	1,280,541	78,30	493,713	193,444	193,444	
Gulf, Mobile & Northern.	349	8,974,873	961,770	10,664,434	5,121,187	5,121,187	5,121,187	5,121,187	5,121,187	5,121,187	5,121,187	452,359	452,359	452,359	
Hocking Valley.	109	879,487	5,121,187	5,121,187	5,121,187	5,121,187	5,121,187	5,121,187	5,121,187	5,121,187	5,121,187	100,118	100,118	100,118	

*Began operation June 1, 1917.

Car Safety Appliances

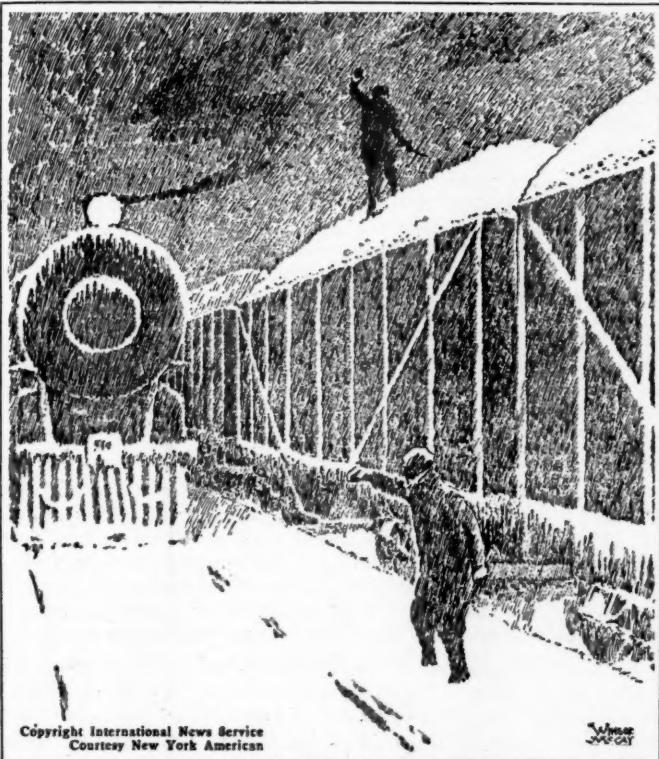
The executive committee of the Master Car Builders' Association has issued Circular No. 26 announcing that the Interstate Commerce Commission has extended the date effective for the application of safety appliances to cars to September 1, 1919. To conform thereto, paragraph (m) of Rule 3 of the Rules of Interchange should read: "After September 1, 1919, no car will be accepted in interchange unless properly equipped with United States safety appliances or United States safety appliances, standard."

"Heroes at Home"

This is the title of a circular which has been issued by E. E. Loomis, president of the Lehigh Valley, addressed to all employees of the road, and accompanied by a picture reprinted from the New York American. The picture and circular are copied below:

"Never have I seen more splendid devotion to duty than that manifested by Lehigh Valley Railroad men in the trying days we have experienced this winter.

"With the temperature for weeks below zero, blizzards and



icy blasts seemed only to spur you on to greater efforts. There have been few slackers.

"I want to express to you my sincerest thanks. That you fought a winning battle is proved by the quick recovery the Lehigh Valley has made from each fearful assault of the weather—by the fact that we are now in shape to give the government the co-operation it rightfully expects.

"This would not have been possible but for the loyalty and untiring work of officers and men."

Boats for New York Barge Canal

One hundred boats of modern type, with necessary motive power, ought to be built at once for use on the New York State barge canal, which probably will be open throughout its length by May 15. This is one of the main recommendations in the report of Gen. W. W. Wotherspoon, superintendent of public works of the State of New York, which has just been sent to the legislature. Gen. Wotherspoon has had no visible success thus far in getting the authorities at Washington to take action looking to the construction of boats by government money or under federal authority. He says that

600 or more of the old style canal boats still in existence ought to be requisitioned and put into service on the canal this year. To show that under present conditions canal boats can make even better time than is made by the railroads, Gen. Wotherspoon has compiled records of a number of freight shipments from Buffalo to New York, and of six cars which were traced the average time was 11 days (440 miles), and the quickest movement was in 8 days.

Regional Directors Appoint Assistants

R. H. Aishton, regional director in charge of the operation of western railroads, with headquarters at Chicago, has appointed M. J. Gormley, assistant in the president's office of the Chicago & North Western, operating assistant, and J. G. Woodworth, second vice-president in charge of the traffic of the Northern Pacific, traffic assistant.

C. H. Markham, regional director in charge of the operation of railroads in the South, with headquarters at Atlanta, Ga., has appointed L. W. Baldwin, vice-president and general manager of the Central of Georgia, his operating assistant, and Charles R. Capps, first vice-president in charge of traffic of the Seaboard Air Line, his traffic assistant.

Mail to Be Sent by Airplane

The Postmaster General proposes to establish aerial transportation for letters, on one route, as soon as practicable, and has asked for bids for the construction of five airplanes for an aerial route for the delivery of first-class mail between Washington, Philadelphia, and New York, making one round trip per day. The contract will be awarded to the bidder whose airplanes have stood satisfactory service test in the war and navy departments. It is the purpose of the Post Office Department to make this a permanent service. An appropriation of \$100,000 is available. The call for bids requires airplanes capable of carrying 300 pounds of mail a distance of not less than 200 miles without stop, at a maximum speed, full load, of 100 miles an hour, a minimum speed, full load, of 45 miles, climbing speed of 6,000 feet in 10 minutes. The planes must have the Hispano-Suiza motor, 150 h. p.

The intention is, as soon as the authority of Congress is received, to establish a through aerial route to Philadelphia and New York, carrying 300 pounds of first-class mail, for the transmission of which a special postage rate will be charged, not exceeding 25 cents an ounce.

Conference on Conservation of Railway Fuel

A conference recently was held in Chicago between Maj. E. C. Schmidt, representing the Fuel Administration, and a number of representatives of the railways regarding methods which should be adopted to promote greater conservation of fuel by the railways. Major Schmidt, who was formerly professor of railway engineering in the University of Illinois, has been assigned by the War Department to the Fuel Administration, and the conference was called by him. Almost a year ago the International Railway Fuel Association appointed a committee which tendered its services to the Government for the purpose of bringing about co-operation regarding the use of fuel by railways. The members of this committee participated in the conference with Major Schmidt. They include Eugene McAuliffe, chairman, formerly general coal agent of the Frisco System, who is now in the coal business; W. L. Robinson, Baltimore & Ohio; E. W. Pratt, Chicago & North Western; L. R. Pyle, Soo Line; and D. C. Buell, Railway Educational Bureau. Others who participated in the conference were M. K. Barnum, Baltimore & Ohio; John Crawford and A. W. Wilson, Burlington, and Charles Hall, Indiana Coal Operators' Association. One suggestion made at the conference was as to the possibility of a unified system of fuel conservation on all the railways. It is an unsettled question whether the matter of fuel conservation on the railways will be handled by the Fuel Administration or under the Director General of Railroads.

Following the Chicago conference, the Executive Committee of the International Railway Fuel Association telegraphed the Fuel Administrator, tendering the services of the association, its members and its executive committee, to the conservation division of

the Fuel Administration, "to make use of in any manner that can be advantageous to them in their tremendous and most important undertaking." The message was signed by E. W. Pratt, J. G. Crawford and W. H. Averell.

Congestion on the Pennsylvania

The daily statement issued by Commissioner McChord on February 18 of reports of the Interstate Commerce Commission inspectors on congestion of freight traffic, contains the following as to conditions on the Pennsylvania:

"The report of cars stored between terminals shows that on February 13 there were 4,285 loads and 9,799 empties, or a total of 14,084 cars, stored between terminals, while on February 4 there were 6,233 loads and 20,259 empties, a total of 26,492 cars stored between terminals. During the period from February 4 to 14 there was a decrease in the number stored between terminals of 1,948 loads and 10,460 empties, a total decrease of 12,408 cars.

"Comparing the reports of cars on hand for movement in all directions, at the principal yards of the Pennsylvania Railroad, there were on February 5 a total of 36,279 cars on hand, while on February 14 there were 40,484 cars on hand, an increase of 4,205 cars."

Be Good Soldiers!

W. J. Jackson, receiver of the Chicago & Eastern Illinois, recently issued an extended statement on patriotism which was sent to every employee of the road. The circular points out that the duty of the railroad employee in this country is no less sacred than that of the man in khaki "over there." Mr. Jackson's statement reads in part as follows:

"We all know that if our boys now in France are to accomplish anything; if the sacrifice of the lives in the sinking of the transport *Tuscania* the other day is to be avenged; if the outrages on humanity committed by the enemy are to be stopped—it will be by Americans—by us folks at home by our work, and as our efforts either give our soldiers and their allies all they need to fight with or fail to do so.

"If you were 'Over There' in a uniform, you wouldn't be an American unless you were 'on your toes' in doing things. No duty would be too difficult, disagreeable or dangerous for you to undertake cheerfully. This is the report that comes from every one of our boys now there, and it is just as true of those yet to go. The reports of the bravery and energy of the railroad recruits are particularly gratifying.

"Every railroad and every railroad man must 'do his bit' by doing his best to meet this emergency. To do our best is our plain duty; to do any less is absolute treason to those over in Europe risking their lives and sacrificing their life plans and many of them their health, for our account.

"Every extra effort in the repair of engines or cars; every additional car of freight moved; every little delay saved in keeping things going; every little misunderstanding avoided and every little cause for grumbling or dissatisfaction removed, will help just that much—for it is in doing the small things as they should be done that friction is avoided—and we must all try to avoid friction of every nature if we are to build up a proper spirit of co-operation to carry on our work."

New York Railroad Club

The next meeting of the New York Railroad Club on March 15, will be known as Annual Electrical Night. Edwin B. Katte, chairman of the committee, announces the following program for the occasion, the subject being "Recent Electric Locomotives."

The New York, New Haven & Hartford new 180-ton passenger locomotive, which will be presented by E. R. Hill.

The Chicago, Milwaukee & St. Paul new gearless, bi-polar passenger locomotive under construction by the General Electric Company, which will be described by A. H. Armstrong, illustrated by lantern slides from photographs of the general drawings.

The Chicago, Milwaukee & St. Paul new quill gear locomotive under construction by the Westinghouse Electric & Manufacturing Company, which will be described by F. H. Shepard, of the Westinghouse Company, and illustrated by lantern slides.

The New York Central latest electric passenger locomotive, which will be briefly described by Mr. Katte, and illustrated with lantern slides.

Society for Testing Materials

The twenty-first annual meeting of the American Society for Testing Materials will be held at the Hotel Traymore, Atlantic City, N. J., on June 25 to 28, 1918. Atlantic City was selected as the place for this meeting on the basis of the information received a year ago in reply to a detailed inquiry addressed to the membership which showed a decided preference for this city over others suggested. The annual meetings of this society have been held at Atlantic City for the past 16 years, with the single exception of that in 1903, which was held at Delaware Water Gap.

Traffic News

The National Industrial Traffic League will hold its spring meeting at the Hotel LaSalle, Chicago, on March 21 and 22.

Irving T. Bush, president of the Bush Terminal, New York City, has resigned his position as chief executive officer of the War Board for the port of New York.

In Canada freight cars loaded with export freight must be filled to their full capacity. This is the substance of an order recently issued by the Canadian Railway War Board.

The Boston & Maine has discontinued the use of dining cars on three through trains leaving Boston for Montreal in the morning and on corresponding trains southward.

The Canadian Pacific announces further extensive reductions in passenger train service on its western lines. On some branches of light traffic the single train each way will run every other day instead of every day.

The state commissions of Indiana, Illinois, Michigan, Wisconsin and all but four states west of the Mississippi river have so far issued orders changing the demurrage rules applicable to intrastate traffic to conform with the latest revision of the interstate rules by the director-general of railroads.

Conrad E. Spens, vice-president in charge of traffic of the Chicago, Burlington & Quincy, has been appointed director of transportation for the United States Food Administration succeeding Edward Chambers, who had been serving since the first of the year as director of traffic in the railroad administration.

The Kansas City-Missouri River Navigation Company announces that beginning March 1 its transportation equipment, consisting of two tow boats and nine steel merchandise and lighter barges, will be ready for service on the Missouri River. The company expects to carry 2,000 tons of merchandise a week between East St. Louis, Ill., and Kansas City, Mo.

R. H. Aishton, regional director of western railroads, has asked the roads in his territory to prepare statements showing the location of traffic soliciting offices, both on the line and at outside points, indicating whether an agency is a passenger or a freight office or a joint office, and setting forth the cost of the maintenance of each agency, itemized according to the expenditures for rent, salaries and other expenses.

A large delegation of representatives of New England textile mills called on various government officials at Washington on February 18, to urge the necessity of increased coal shipments. They were assured by Director General of Railroads McAdoo and Chairman Hurley of the Shipping Board that transportation of 600,000 tons of coal by water and 400,000 tons by rail a month to New England was assured. This was more than the New Englanders had asked for.

Six million meals were served on Southern Pacific dining cars and restaurants in the twelve months ending with November, 1917. This is stated in the report of Allan Pollok, superintendent of the commissary department of the company. The Southern Pacific operates more dining cars than any other road in the country, and Mr. Pollok says that it has been complying fully with the suggestions of the Food Administration as to meatless Tuesdays and wheatless Wednesdays.

The buffet observation cars heretofore run on the Union Pacific-North Western train No. 10 from Ogden, Utah, to Omaha, Neb., and from Cedar Rapids, Iowa, to Chicago, have been temporarily discontinued. The Chicago & North Western also announces the following additional reductions in sleeping car service: Through sleepers from Kansas City, Mo., to Minneapolis, Minn., northbound, leaving Kansas City via the Missouri Pacific at 1:55 p. m. and the Chicago, Burlington & Quincy at 11:35 a. m., and southbound, leaving Minneapolis at 6:15 p. m., and entering Kansas City via the

C. B. & Q. and the Missouri Pacific, respectively, have been discontinued. The through Kansas City-Sioux City sleepers, leaving Kansas City via the Missouri Pacific at 11 p. m. and leaving Sioux City, Iowa, at 8 p. m., have also been discontinued.

The Transportation Club of Louisville, Ky., held its annual meeting at the Old Inn Hotel on February 12; and the following directors and officers were elected: president, Ralph H. Morris, general freight agent, Southern Railway; vice-president, C. B. Stafford, manager traffic department, Louisville Board of Trade; secretary-treasurer, W. T. Vandenburg, commercial agent, Seaboard Air Line; directors, H. H. Hughes, Jr., superintendent, John P. Morton & Co.; Brent Arnold, Jr., division freight agent, Cleveland, Cincinnati, Chicago & St. Louis; Walter R. Hensley, vice-chairman commission on car service and embargo zone chairman; Arthur S. Key, traffic manager, Federal Chemical Company. The speakers at the banquet included Capt. Fernand Renaudeau of the French army, Capt. George F. Jeanes of the British army, Brig. General D. B. Devore of the American army and T. C. Mapother, a Louisville attorney.

An officer of the Canadian Pacific says that his road on one occasion diverted by way of the Soo Line 1,000 cars of freight so as to relieve the main line along the north shore of Lake Superior. These cars went from Winnipeg, via Minneapolis, to Sault Ste. Marie, and thence to Ontario. They consisted chiefly of grain for domestic consumption in Canada. One hundred cars of freight per day are being diverted from the Canadian Pacific at Quebec and are sent over the National Transcontinental to Halifax. This relieves the Canadian Pacific main line to St. John for classes of export freight more urgently required there. From Toronto 120 cars of freight eastbound for Montreal are turned over from the Canadian Pacific to the Canadian Northern every day. The Grand Trunk during the winter season has been diverting from 150 to 200 cars of coal per day to the Canadian Pacific and the Toronto, Hamilton & Buffalo, in order to lessen the congestion on the Grand Trunk at the Niagara frontier. The Grand Trunk has also diverted fifty cars a day to the Canadian Northern at Toronto.

Regulation of Railroad Steamers

The Marine Section of the Transportation Division is a new bureau of Director General McAdoo's organization to supervise the operation of coastwise steamship lines owned by railroads which were taken over by the Government. W. H. Pleasants, president of the Ocean Steamship Company of Savannah, Ga., has been appointed manager of the Marine Section and will give special attention to co-ordinating the relations between all shipping, including that on the Great Lakes, and the railroads.

Holiday Traffic Restricted

Director General McAdoo declined to give his approval to a plan for transporting a large body of Pennsylvania National Army troops from Camp Meade to Philadelphia for a parade on Washington's Birthday, holding it an unwarrantable use of engines, cars and tracks in the congested district. He has, however, approved a plan for the movement of two regiments from Camp Upton, over the Long Island road, to New York, the Long Island being in a position to handle the movement.

Campaign to Reduce Accumulation of Freight at Chicago Freight Houses

The Chicago regional committee of the National Industrial Traffic League, which is co-operating with the Chicago committee of the Car Service Section of the Railroad Administration with a view to conserving transportation facilities in general, has been requested by the carriers to conduct a special campaign among receivers of freight, emphasizing the necessity for calling for shipments promptly upon receipt of notice of arrival. Under the storage rules the receiver of freight is entitled to 48 hours, free time, but some receivers make a practice of permitting their l. c. l. shipments to accumulate at the inbound stations for several days and weeks before arranging for disposition. The railroads are

furnishing the League's committee with the names of consignees who fail to remove their freight within 72 hours after notice, and the committee in turn is taking such cases up with the consignees and asking them to co-operate in the general movement to prevent congestion at the stations.

Drastic Embargo Covering 314 Square Miles

The three principal railroads in Philadelphia, the Pennsylvania, the Philadelphia & Reading and the Baltimore & Ohio, announced last week that, beginning February 18, no freight would be accepted at any point within ten miles of the Philadelphia city hall for movement to other points within that territory—an area equal to 314 square miles. There are 96 freight stations within this territory. Movement of freight from one station to another within the city of Philadelphia was discontinued, by these roads, two months ago.

Freight Moving Freely

The congestion of freight in "Eastern" territory has been very materially relieved. By a report issued by A. H. Smith, regional director, it appears that between February 6, when the congestion was at its highest point, and February 19, the reduction in the number of freight cars "above normal" on all of the lines was 44 per cent. Temperatures are now favorable throughout this territory.

The detailed figures on the two dates named and for February 20 are shown below:

Cars above normal	February 6	February 19	February 20
Eastbound—loads	59,784	39,257	38,910
Eastbound—empties	13,345	3,140	4,048
Westbound—loads	39,841	28,287	26,940
Westbound—empties	47,934	19,090	17,400
 Total loads	99,625	67,544	65,850
Total empties	61,279	22,230	21,448
 Grand total	160,904	89,774	87,298

The movement of food supplies from the West direct to ships in New York harbor by the special system of solid through trains termed "G. O. C. Specials," is now under full headway in large volume. Pig iron production has been increasing rapidly in the past few days as a result of the advent of mild weather, and at many blast furnaces the receipts of coke have been in excess of requirements. The production of steel has not undergone an increase corresponding with the increase in pig iron production, for the reason that steel production has been limited by the ability to ship the finished product. Nearly all mill warehouses and yards in the Pittsburgh region are still filled with steel awaiting shipment.

The Pennsylvania Railroad reports a marked improvement in shipments of soft coal and general freight. In the first 18 days of February 22,620 cars of bituminous coal passed Lewistown Junction. This compares with 18,141 cars in the corresponding period of January, and 18,661 cars in December. This eastbound bituminous movement for the first time since last summer shows an increase compared with the corresponding period a year ago.

Operating conditions in the West continue to improve since mild weather set in. Special attention is still being given to the movement of grain in the Western States. Statistics of grain receipts last week indicate that the order of the director general of railroads giving priority to the movement of grain in Western States has materially increased the number of cars loaded. Grain receipts at Chicago last week were 7,280,000 bushels, an increase of 4,583,000 bu., or 169 per cent over the previous week, and 3,341,000 bu., or 83 per cent, over the same week a year ago. The increase in the receipts of corn over the previous week was 2,216,000 bu., and of oats 1,418,000 bu. Receipts of grain at all the primary markets for the week ended February 16 totaled 22,104,000 bu., or 54 per cent over the receipts of the previous week, and 51.5 per cent over those of the same week a year ago.

PRODUCTION OF GOLD AND SILVER in the United States during the calendar year 1917 was less than in 1916 as shown by the statistics of the Bureau of the Mint and the United States Geological Survey. Gold produced in 1917 was valued at \$84,456,600 as against \$92,590,300 in 1916, and silver was valued at \$61,140,300 in 1917 as against \$61,280,629 in 1916.

Commission and Court News

Personnel of Commissions

J. E. Benton, of Keene, N. H., has been appointed solicitor of the Bureau of Valuation of the Interstate Commerce Commission, succeeding **P. J. Farrell**, who has been appointed chief counsel of the commission. Mr. Benton was formerly connected with the Bureau of Valuation as valuation analyst and examiner.

P. J. Farrell, who has been appointed chief counsel to the Interstate Commerce Commission, as was announced in these columns last week, was born on May 10, 1861, and admitted

to practice in all the courts of Vermont in 1887 as attorney at law and solicitor in chancery. In April, 1906, he was admitted to practice in the Supreme Court of the United States. Mr. Farrell was in the railroad service several years; beginning with the Connecticut & Passumpsic Rivers road, now a part of the Boston & Maine, in 1880. He was station agent, conductor, clerk in general freight office and train despatcher. He was subsequently a railway postal clerk, and in 1888 he was promoted

to be chief clerk of railway mail service, with headquarters at Boston. In 1889 he resigned this place and became law partner of Charles A. Prouty, former Interstate Commerce Commissioner and now director of the bureau of valuation of the Interstate Commerce Commission. Mr. Farrell practiced law at Portland, Ore., and Newport, Vt., until 1901, when he entered the employ of the Interstate Commerce Commission, where he has acted as attorney in cases before the commission and in the courts, and as solicitor of the bureau of valuation.



P. J. Farrell

State Commissions

Wasteful Duplication of Facilities

In an order issued on February 4 the Railroad Commission of the State of California dismissed the complaint of the city of San Jose vs. the Southern Pacific and the Western Pacific asking for the erection of union passenger and freight terminals as well as the use of certain tracks jointly. The Commission, however, emphasized the importance of avoiding the wasteful duplication of railroad construction and operation. In anticipation of the termination of its franchise through San Jose, the Southern Pacific some time ago secured the permission of both the city and the railroad commission to build a new line through the outskirts of the city. Permission was also granted to the Western Pacific to build a line from Niles to and through San Jose. The complaint of the city was that the projected lines would surround the principal portions of San Jose, thereby rendering communication between the city and the surrounding territory difficult and dangerous, and would greatly depreciate the value of property in a residence section which the Western Pacific planned to pass through. In order to overcome these objections and also to eliminate the unnecessary duplication of grade crossings, the city asked that the two roads use the same tracks in the city and erect union passenger and freight stations. The commission found that a union passenger station was not particularly needed in San Jose and that the construction of several small freight

houses in various parts of the city would be just as convenient to shippers as a joint station. It was the opinion, however, that in the interest of economy and safety the Western Pacific should use the Southern Pacific line not only in San Jose, but also from Niles to San Jose, with the privilege of building such spurs therefrom as might be thought necessary to develop business for the road.

The testimony offered with reference to the proposed construction of the line by the Western Pacific from Niles to San Jose, about 20 miles, showed that the president of that road had attempted without success to effect an agreement with the Southern Pacific for the use of the latter's line from Niles to Milpitas, 11 miles. On this subject the Commission says: "The attitude of the Southern Pacific in refusing to negotiate on this subject with the Western Pacific does not commend itself to us. This attitude is contrary to the growing realization that our nation must put an end to further wasteful duplication of railroad construction. . . . We assume that the question whether the Western Pacific shall get into San Jose will be passed upon by the Director General of Railroads. If he decides that the proposed construction is not justified, particularly at present, there will be no need for considering further the matter now under consideration. On the other hand, if he decides that the Western Pacific may enter San Jose, we hope he will take steps to have this done in such a manner as to prevent the wasteful duplication now contemplated in connection with the Niles-San Jose situation."—*San Jose vs. Southern Pacific and Western Pacific*. Decided February 4, 1918.

Court News

Exclusive Use of Platforms for Express Business

The New Jersey Court of Chancery holds that railroad station platforms being private property the railroad, for a consideration, may contract to give an express company the exclusive right to do an express baggage and passenger business on and from the platform, and such a contract does not create a monopoly.—*Thompson's Express, Etc., Co. v. Whitemere* (N. J.), 102 Atl., 692. Decided December 31, 1917.

Injuries to Live Stock—Waiver of Notice of Claim

The Mississippi Supreme Court holds that the provision of a contract of live stock shipment that the shipper shall file notice of loss within ten days of delivery is waived where shortly after arrival the railroad's proper agent was orally notified of the injuries and damage, and accepted the notice and inspected the animals and wrote on the way bill a memorandum of the injuries and claim.—*Bernstein v. Y. & M. V. (Miss.)*, 77 So., 146. Decided January 2, 1918.

Landowner's Duty Under Right-of-Way Agreement

The Circuit Court of Appeals, Ninth Circuit, holds that under an agreement that a railroad company might build its road across certain land at such a height as to permit the landowner to build a dam on condition that the company would protect its own roadway by ripraping or building a wall, it was the landowner's implied duty in building the dam to use every reasonable precaution by the construction of a spillway or other suitable device to carry off flood waters.—*Eastern Oregon Land Co. v. Deschutes R. Co.*, 246 Fed., 400. Decided October 1, 1917.

Commission's Order as to Station Facilities

An order of the South Dakota Railroad Commissioners required the Chicago & North Western to provide a suitable station house in place of two box cars, and maintain an agent in a town of 40 inhabitants, with two stores, lumber yard, coal yard, blacksmith shop and insurance office, in a farming community, and at which, during the year previous, the company transacted \$10,000 of business, \$7,000 of which was freight in carload lots. The South Dakota Supreme Court holds that the order was reasonable as to the maintenance of an agent, but that the evidence was insufficient to show that station facilities were inadequate.—*Barnard v. Chicago & N. W.*, 166 N. W., 148. Decided January 18, 1918.

Equipment and Supplies

Locomotives

THE HUDSON COAL COMPANY has ordered one 21-ton four-wheel tank locomotive from the American Locomotive Company.

THE DELAWARE RIVER STEEL COMPANY has ordered one 47½-ton four-wheel tank locomotive from the American Locomotive Company.

THE SOUTH MANCHURIAN RAILWAY has ordered 25 superheater Mikado locomotives weighing 230,000 lb. from the American Locomotive Company.

THE SOUTH AFRICAN RAILWAYS have ordered 20 superheater Mountain type locomotives weighing 195,000 lb. from the American Locomotive Company.

Specifications for the following locomotives have recently been determined on orders received some months ago by the American Locomotive Company: Western Pacific, 5 Mikado locomotives weighing 330,000 lb.

Freight Cars

THE UNITED STATES GOVERNMENT has ordered for use on military railroads in France 950 box cars from the American Car & Foundry Company, 500 low side gondola cars from the Cambria Steel Company, 250 box cars from the Mt. Vernon Car & Manufacturing Company, 500 box cars from the Pullman Company, 200 box cars and 750 high side gondola cars from the Standard Steel Car Company, 250 refrigerator cars from the Haskell & Barker Car Company, 100 box cars from the St. Louis Car Company and orders will be placed shortly for 500 additional box cars and 500 additional low side gondola cars.

Signaling

THE DELAWARE, LACKAWANNA & WESTERN has purchased two A. G. A. single-arm railway grade crossing signals from the A. G. A. Railway Light & Signal Company, Elizabeth, N. J.

CEMENT PRODUCTION IN THE UNITED STATES is almost exclusively for domestic use, says a recent bulletin of the National City Bank of New York, the exports having amounted in value to but \$5,822,000 in 1913, the high record year, and \$4,112,000 in 1917.

NEW RAILROAD INTO MONGOLIA.—A. W. Ferrin, acting commercial attaché at Pekin, China, writes under date of December 24, 1917, as follows: It is reported that negotiations are on foot for a loan for the extension of the new Supingkai-Chengchiatun Railway from Chengchiatun, Manchuria, to Kailu, in Eastern Mongolia. The Supingkai-Chengchiatun line, which was constructed by means of a loan from the Yokohama Specie Bank, is now considered completed, as construction trains carrying passenger cars are running on a regular published schedule between Supingkai and Chengchiatun, though over a temporary wooden bridge across the Liao. The proposed extension into Eastern Mongolia is 130 miles in length, and it is said that 1,500,000 yen (roughly, \$750,000 U. S.) will build it. According to the agreement under which the Supingkai-Chengchiatun Railway was built, the Yokohama Specie Bank must be given first chance to advance any funds needed for extension of line. The new loan will probably be 2,000,000 yen (\$1,000,000). The extension of this railway into Eastern Mongolia was contemplated from the first, as Japan is anxious to get into railway communication with that comparatively undeveloped country. The charter of the Oriental Development Company has recently been amended in order to make it freer to advance money for industrial developments in Eastern Mongolia as well as in Manchuria.

Supply Trade News

The Asbestos Protected Metal Company, Pittsburgh, announces the removal of its Boston office to the State Mutual building to be in charge of Wm. H. Cummings.

J. A. McNulty, roundhouse foreman of the Chicago & North Western, at Chicago, has entered the railway sales department of the Anchor Packing Company, with headquarters at Chicago.

The Pittsburgh Wood Preserving Company, the Ohio Wood Preserving Company, the Michigan Wood Preserving Company and the Acme Tie Company have moved their general offices to the Century building, Pittsburgh, Pa.

E. L. Marshall, of the railway sales department of the National Carbon Company, Inc., Cleveland, Ohio, resigned his position February 1. A. E. Pratt, for several years signal supervisor of the Erie at Marion, Ohio, will succeed Mr. Marshall and take over his work as special railway salesman.

W. S. King, formerly general superintendent of the Illinois Central, has entered the supply field with offices in the McCormick building, 332 South Michigan avenue, Chicago. He will represent the Damascus Brake Beam Company and the Frost Railway Supply Company, together with general railway supplies.

The Louisville Frog & Switch Company, Louisville, Ky., has been incorporated with a capital stock of \$200,000 to take over the business of the W. M. Mitchell Company, Inc., and to manufacture switches, frogs, crossings and other special track apparatus and fastenings. The officers include W. M. Mitchell, president, and H. O. Wieland, secretary and treasurer. Charles H. Krauss, superintendent of the Weir Frog Company, Cincinnati, Ohio, has resigned to become general superintendent of the Louisville Frog & Switch Company. Previous to his connection with the Weir Frog Company, Mr. Krauss was connected with the Lorain Steel Company, Johnstown, Pa., and with the Kilby Frog & Switch Company, Birmingham, Ala., for a number of years in the capacity of superintendent.

Griffin Wheel Company

The necessity of working out excess profit tax requirements has delayed the publication of the annual report of the Griffin Wheel Company, Chicago, for the year ended December 31, 1917. The company has, however, given out a preliminary statement covering its operations during the past year. After reserving about \$250,000 for extraordinary taxes, a net profit of approximately \$1,100,000 was earned. Net quick assets on December 31, 1917, amounted to over \$6,000,000 of which \$1,007,000 was in cash and \$1,500,000 in United States government and state securities. The company owes no money, and since 1907 has not found it necessary to enter the money market even for temporary loans.

While continuing its policy of paying annual dividends out of the previous year's earnings, the Griffin Wheel Company will, on March 1, anticipate its semi-annual dividend of 3½ per cent on the 92,820 shares of common stock outstanding, due September 1, and pay a full year's dividend calling for \$649,740 out of the last twelve months' operations. This action will be taken to clear up the surplus account in preparation for taxes.

The company advanced the price of its wheels in January, 1917, after an uninterrupted period of uniform prices since 1884, with the one exception of the year 1907 when an advanced price was maintained for a short time. Although the company could have profited to the extent of about \$400,000 by increasing the price of its product to conform with the marked advances in the cost of materials during the past three years, advance purchases made possible the deferral of an advance in prices until the time aforementioned. In fact, the company did not increase its prices until the cost of raw materials had advanced more than 100 per cent.

Financial and Construction

Railway Financial News

LAKE SUPERIOR & ISHPEMING.—At a meeting of the stockholders of this company R. C. Mann, C. D. Mason and W. P. Beldon were elected to the board of directors, succeeding J. B. Laughlin, T. F. Jones, Jr., and J. H. Hoyt.

MUNISING, MARQUETTE & SOUTHEASTERN.—At a meeting of the stockholders of this company W. P. Beldon was elected to succeed J. H. Hoyt as a member of the board of directors.

PACIFIC GREAT EASTERN.—The suits which were brought in the courts by the British Columbia government against Foley, Welch & Stewart and the railway company have been settled, and the government will take over the property and the contractors will drop out of it. It is expected that legislation will be introduced to provide for the completion of the road from the present end of the line 23 miles north of Clinton, to Prince George, and for the administration of the railroad by the Minister of Railways. The lands and property of the Pacific Great Eastern Land Company and all subsidiary companies will also be handed over. There are now on hand 8,000 tons of rails available for the completion of the road, and also some other material; and there is standing an order for 21,000 tons of rails recently financed by the government, let to the United States Steel Corporation, which, on instructions, must commence delivery.

UNION PACIFIC.—A quarterly dividend of 2½ per cent has been declared on the common stock, together with the regular semi-annual dividend of 2 per cent on the preferred stock, both payable April 1 to stock of record March 9. This puts the common stock on a 10 per cent basis, as the last previous common dividend paid was 2 per cent regular, with ½ of 1 per cent extra.

Railway Construction

SOUTHERN RAILWAY.—Improvements will be made to the facilities at Sheffield, Ala., for handling the increase in traffic incident to the location of the government nitrate plant at this place. The present passenger and freight stations will be enlarged, additional yard tracks will be installed, and additions to the local shop facilities are also contemplated.

GREAT EASTERN RAILWAY'S SEA WATER SUPPLY.—The Great Eastern Railway has announced that it will no longer carry sea water. What is surprising about this notice is, not that the traffic has been stopped, but that, in these times, it should have been continued so long.—*The Engineer, London.*

THE COAL SITUATION IN FRANCE.—Before the war France consumed about 65,000,000 tons of coal yearly, of which, in round figures, 41,000,000 tons were of domestic production and 24,000,000 tons were imported from abroad; that is to say, from Great Britain, Germany and Belgium. The monthly consumption in peace times thus amounted to 5,400,000 tons, says a report of Commercial Attaché C. W. A. Veditz from Paris, dated January 5. In 1916 the domestic mines produced only 20,000,000 tons, and the imported coal amounted to only 19,000,000 tons, making the total quantity available for consumption 39,000,000 tons. In November, 1916, a typical month, the French mines produced 1,800,000 tons of coal and the imports amounted to 1,500,000 tons, the available monthly supply being therefore 3,300,000 tons, which represents a deficit, compared with the monthly consumption in 1913, of approximately 40 per cent. It should, of course, be noted that the invaded portions of France contain the principal French coal mines, and that therefore the war has cut off the chief source of supply and has made necessary the more intensive exploitation of the mines in the uninvaded regions.

Railway Officers

Executive, Financial, Legal and Accounting

F. A. Moses, Jr., has been appointed freight claim agent of the Tennessee Central, with office at Nashville, Tenn., vice H. R. Smith, resigned.

J. M. Wood, assistant to the treasurer of the Pennsylvania Railroad, and assistant treasurer of the Long Island Railroad, with headquarters at Philadelphia, Pa., has been appointed assistant treasurer of the Pennsylvania Railroad.

James M. Kurn, president of the Detroit, Toledo & Iron-ton, with office at Detroit, Mich., was elected vice-president in charge of operations and construction of the St. Louis-San Francisco, on February 13, succeeding E. D. Levy, resigned.

C. D. Mason has been elected secretary and **R. C. Mann**, assistant secretary, has been elected treasurer, of the Lake Superior & Ishpeming and the Munising, Marquette & South-eastern, with headquarters at Cleveland, Ohio, succeeding W. D. Pollock.

Decatur Axtell, who has resigned as vice-president of the Chesapeake & Ohio, the Hocking Valley and the Chesapeake & Ohio of Indiana, with office at Richmond, Va., as was announced in these columns last week, was born at Elyria, Ohio, and was educated at Illinois College. On March 16, 1864, he began railway work as a rodman with an engineering corps on the Pacific of Missouri and later served in various engineering capacities on the St. Louis & Iron Mountain, the Cairo & Fulton and the St. Louis, Iron Mountain & Southern, now forming part of the Missouri Pacific, until July, 1880.

He was then appointed general manager of the Richmond & Allegheny and in April 1882, he was appointed vice-president and general manager of the same road. In June, 1883, when the R. & A. went into the hands of a receiver, he was appointed receiver and manager and in May, 1889, when the R. & A. was acquired by the Chesapeake & Ohio, Mr. Axtell was made second vice-president of the latter road. In addition to serving the Chesapeake & Ohio as vice-president, Mr. Axtell, in December, 1889, was elected president of the Toledo & Ohio Central and vice-president of the Kanawha & Michigan. Three years later he was elected chairman of the board of directors of the Toledo & Ohio Central, serving in that capacity until April, 1909; from 1903 to 1910, he was also chairman of the board of directors of the Kanawha & Michigan. In April, 1910, he was elected vice-president of the Hocking Valley and in August, 1910, vice-president of the Chesapeake & Ohio of Indiana, serving in these capacities until the date of his resignation. Mr. Axtell has been in charge of the accounting and treasury departments and has also been chairman of the Valuation Committee of the Chesapeake & Ohio Lines.

Ralph Budd, who has been elected executive vice-president of the Great Northern, as was announced in our issue of February 15, was born at Waterloo, Iowa, on August 20, 1877, and was graduated from Highland Park College of Engineering at Des Moines, Iowa, in 1899, following which he began railway work with the Chicago Great Western. Until 1902 he was consecutively draftsman, rodman, levelman, instrumentman and assistant engineer, and



Decatur Axtell

from the latter date to 1905 was successively roadmaster, general superintendent of construction on the St. Louis division and division engineer of that division. He was then transferred to Chicago as division engineer. The following year he became chief engineer of the Panama Railroad at Colon, Panama, where he remained until 1909, when he went to the Oregon Trunk as chief engineer. From 1910 to May 1, 1914, he also was chief engineer of the Spokane, Portland & Seattle, and from 1911 to Jan. 1, 1913, also chief engineer of the Spokane & Inland Empire and Spokane Traction Company at Portland, Ore. Mr. Budd was appointed assistant to the president of the Great Northern on January 1, 1913, and on February 15 was appointed chief engineer. On May 1, 1914, he again became assistant to the president, which position he retained until his recent election as vice-president.

Operating

W. G. Choate has been appointed general manager of the Houston Belt & Terminal Railway, with office at Houston, Tex.

J. J. Grosche has been appointed master of trains of the Louisville & Nashville, Kentucky division, with office at Paris, Ky., vice **J. G. Metcalfe**, resigned.

C. C. Fisher has been appointed trainmaster of the Sacramento division of the Southern Pacific, with headquarters at Sacramento, Cal., succeeding **C. A. Collins**.

J. A. Gordon, general manager of the Chicago Great Western at Chicago for the past four years and an officer of that road for seven years, has resigned, effective March 1.

D. J. Morris, assistant superintendent of transportation of the Wheeling & Lake Erie, with headquarters at Brewster, Ohio, was appointed superintendent of car service with the same headquarters, effective February 1.

F. L. Horton, chief despatcher of the Central of Georgia, with office at Macon, Ga., has been appointed trainmaster, with headquarters at Albany, vice **H. M. Sours**, resigned; and **W. L. Chandler** has been appointed chief despatcher with headquarters at Macon, vice Mr. Horton.

F. M. Smith, superintendent of passenger transportation of the New York Central lines west of Buffalo, has been appointed assistant to the general superintendent of the Fourth district, with headquarters at Chicago, and **L. C. Anderson** has been appointed superintendent of passenger transportation, vice Mr. Smith.

W. L. Ekin, division engineer of the Pennsylvania lines, St. Louis System, with headquarters at Terre Haute, Ind., has been promoted to superintendent of the Peoria division, succeeding **Taber Hamilton**, with headquarters at Decatur, Ill., effective February 11. Mr. Ekin entered the service of the Pennsylvania Lines, on July 6, 1900, and was appointed assistant engineer on the Michigan division on September 1, 1905. He was promoted to division engineer of the same division on May 1, 1907, and was later transferred to the St. Louis division, at Terre Haute, which position he held at the time of his appointment.

Frank P. Barr, superintendent of transportation of the Wheeling & Lake Erie, with headquarters at Brewster, Ohio, was appointed assistant to the general manager of that road, with headquarters at Cleveland, Ohio, effective February 1. He was born in Canton, Ohio, in 1878, and received his early education in the public schools of that city. He entered the service of the Cleveland, Canton & Southern, on July 1, 1895, as a car record clerk in the office of the car accountant. He continued in that position until August, 1899, in which year the Wheeling & Lake Erie absorbed the Cleveland, Canton & Southern. He was clerk in the office of the superintendent of car service from that date until February, 1906, at which time he was promoted to chief clerk. He was appointed car accountant in May, 1907, and on June 10, of the following year, was promoted to superintendent of car service. He remained in that position until July 1, 1912, when he was promoted to superintendent of transportation, which office he held until February 1, 1918, when his appointment as noted above became effective. Mr. Barr has been in

railway service for practically 22 years, and as superintendent of transportation of the Wheeling & Lake Erie, was responsible for the successful operation of the lake coal pooling plan, which was made effective at the Huron, Ohio, lake port of that road during 1916, and resulted in the members of that pooling arrangement urging the adoption of the general pooling plan to include all bituminous coal shipments for the upper lake docks during 1917. The position of superintendent of transportation has been abolished.

Frank L. Fletcher, who has been appointed superintendent of the Huntington division of the Chesapeake & Ohio, with headquarters at Huntington, W. Va., as has already been announced in these columns, was born on September 21, 1885, at Mount Sterling, Ky., and was educated in the public schools of his native town. He began railway work on September 18, 1901, as a telegraph operator on the Chesapeake & Ohio. He remained in that position until September, 1906, when he was appointed train despatcher. From March, 1912, to October, 1914, he was assistant trainmaster and then was promoted to trainmaster. Since July, 1916, he served as superintendent of terminals of the Chesapeake & Ohio, the Cleveland, Cincinnati, Chicago & St. Louis and the Louisville & Jeffersontown Bridge & Railroad Company, with office at Louisville, Ky., until his recent appointment as superintendent of the Huntington division of the Chesapeake & Ohio, as above noted.

Andrew R. Macgowan, whose appointment as superintendent of the Pennsylvania division of the Delaware & Hudson, with headquarters at Carbondale, Pa., has already been announced in these columns, was born on January 16, 1883, at Moncton, N. B., and was educated in the high schools. He began railway work on January 19, 1899, with the Canadian Government Railways, and served consecutively as clerk, rodman and transitman until April, 1904, when he became contractor's engineer on the Northern Maine Searsport branch of the Bangor & Aroostook. From January to November, 1906, he was resident engineer of the Somerset Railway, now a part of the Maine Central, and then returned to the service of the Canadian Government Railways as assistant engineer, remaining in that position until April, 1915. He was then to December, 1915, division engineer and from January to June, 1916, was principal assistant engineer. In July, 1916, he was appointed superintendent, which position he held until he left to go to the Delaware & Hudson as above noted.

F. Wear, division superintendent of the Great Northern at Great Falls, Mont., was promoted to assistant general superintendent, with the same headquarters, effective February 20, succeeding **John Sesser**, granted an indefinite leave of absence to join the American Expeditionary Forces in France. **J. Weber**, superintendent of terminals, at Seattle, Wash., was appointed superintendent of the Butte division, with headquarters at Great Falls, Mont., succeeding **Mr. Wear**. **T. B. Degnan**, superintendent of the Northern division, with headquarters at Crookston, Minn., was appointed superintendent of terminals, at Seattle, Wash., succeeding **Mr. Weber**. **L. M. Davis** was appointed superintendent of the Northern division, with headquarters at Crookston, Minn., succeeding **Mr. Degnan**. **R. E. Landis**, superintendent of the Marcus division, with headquarters at Marcus, Wash., was transferred to the Spokane division, with headquarters at Spokane, Wash., succeeding **J. L. Close**, transferred to Whitefish, Mont.; succeeding **M. J. Flanigan**, assigned to other duties. **George Wear**, trainmaster at Everett, Wash., was promoted to superintendent of the Marcus division, with headquarters at Marcus, Wash., succeeding **Mr. Landis**.

Traffic

John L. Coffey has been appointed general agent of the Chicago, Milwaukee & St. Paul, at Cedar Rapids, Ia.

H. G. Powell, division freight agent of the Illinois Central, at Omaha, Nebr., has been promoted to assistant general freight agent, at St. Louis, Mo., succeeding **F. H. Law**, promoted. **C. E. Stailey**, traveling freight agent, with headquarters at Oklahoma City, Okla., has been promoted to division freight agent, at Omaha, Nebr., succeeding **Mr. Powell**, transferred.

E. A. Farr, city passenger agent of the Gulf Coast Lines, at Houston, Tex., has been promoted to general agent of the passenger department, with the same headquarters, succeeding **W. H. Pinnick**, resigned.

H. C. Gettier, division freight agent, of the Atlantic Coast Line, with office at Montgomery, Ala., having resigned, to accept service elsewhere, the duties of the Montgomery office will, for the present, be performed by **C. R. Jones**, soliciting freight agent.

J. A. McDonald, district passenger agent of the Canadian Pacific at Brandon, Man., has been transferred to Regina, Sask., succeeding **J. E. Proctor**, who has been transferred to Calgary, Alta., succeeding **R. Dawson**, transferred to Brandon, in place of Mr. McDonald, effective February 1.

A. F. Meyer, general agent of the Cleveland, Cincinnati, Chicago & St. Louis, at Pittsburgh, Pa., was promoted to division freight agent, at Indianapolis, Ind., succeeding **C. R. Lewis**, resigned, effective February 15. **D. H. Hutchinson**, commercial agent, at Boston, Mass., was appointed general agent at Pittsburgh, to succeed Mr. Meyer.

Engineering and Rolling Stock

H. H. Tripp, resident engineer of the Canadian Pacific, at Kenora, Ont., has been transferred to the Edmonton division, with headquarters at Edmonton, Alta., succeeding **R. C. Harris**, who has been transferred to the Calgary division.

J. F. Gildea, division master mechanic of the Canadian Pacific, with office at Montreal, Que., has been appointed master mechanic of the Pennsylvania division of the Delaware & Hudson, with headquarters at Carbondale, Pa., vice **J. J. Reid**, resigned.

W. H. Erskine, master mechanic of the Chicago Great Western, at Des Moines, Ia., has been appointed master mechanic of the Virginian. **Frank Aitken**, master mechanic of the Pere Marquette, at Wyoming, Mich., has been appointed master mechanic of the Chicago Great Western, to succeed Mr. Erskine at Des Moines.

H. H. Carrick, assistant master mechanic of the Southern Pacific at San Francisco, Cal., has been appointed master mechanic of the Stockton division, with headquarters at Stockton, vice **F. P. McDonald**, transferred, and **J. T. Slavin** has been appointed assistant master mechanic of the Coast division, with headquarters at San Francisco, vice Mr. Carrick.

John L. Conerly, whose appointment as master car builder of the Missouri, Kansas & Texas, with headquarters at Denison, Tex., was announced in these columns on January 18, was born in Pike county, Miss., on November 22, 1869. He entered the service of the Illinois Central in December, 1890, as car repainer at McComb, Miss., and was later promoted to inspector. On December 31, 1900, he was promoted to car foreman and transferred to Jackson, Miss., where he remained until June, 1903, when he was transferred to New Orleans, La. He remained at New Orleans until June, 1910, when he was promoted to general car foreman and transferred to Memphis, Tenn. He left the Illinois Central in February, 1914, to take a similar position with the Missouri, Kansas & Texas, at Denison, Tex., and in September, 1914, he was promoted to general car inspector. He was with the Ft. Worth & Denver City and the Midland Valley from September, 1915, to February 15, 1917. He returned to the Missouri, Kansas & Texas as general car inspector on February 15, 1917, and from this position was promoted to master car builder, effective January 1, 1918, succeeding **H. J. Tierney**, resigned.

L. B. Allen, whose appointment as superintendent of maintenance of way of the Chesapeake & Ohio system, with headquarters at Huntington, W. Va., has already been announced in these columns, was born April 19, 1879, at Lexington, Ky., and graduated from the Kentucky State College in 1899, with the degree of civil engineer. He began railway work in the same year as a rodman on the Southern Railway, and from August, 1899, to January, 1904, was engaged on location and construction work on the Chesapeake & Ohio. He was then for one year assistant in the office of the engineer of maintenance of way, and

from January, 1905, to May 1910, was division engineer of the Kentucky division at Ashland, Ky. From May 1, 1910 to 1914 he served as engineer maintenance of way of the Kentucky general division of the same road and the Chesapeake & Ohio of Indiana, with office at Covington, Ky., and as assistant chief engineer. In February, 1914, he was appointed superintendent of the Huntington and Big Sandy divisions of the Chesapeake & Ohio. He later served as general superintendent of the western general division until his recent appointment as superintendent of maintenance of way of the entire Chesapeake & Ohio system, with headquarters at Huntington, W. Va., as above noted.

R. C. Miller, division engineer of the Pennsylvania lines west of Pittsburgh with office at Toledo has been transferred to Terre Haute, succeeding **W. L. Ekin**, promoted; **J. K. Sherman**, division engineer with office at Zanesville, Ohio, succeeds Mr. Miller, with office at Toledo, and **H. W. Brown**, assistant division engineer with office at Chicago, succeeds Mr. Sherman at Zanesville.

Railway Officers in Military Service

George T. Slade, vice-president of the Northern Pacific, has been commissioned as Lieutenant Colonel and has been assigned to railroad service in France on the staff of General W. W. Atterbury, director of transportation of the United States Expeditionary Forces.

Obituary

George H. Alexander, superintendent of freight transportation of the New York Central, with headquarters at New York, died on February 15, at his home in Yonkers, at the age of 49.

C. C. Wright, general solicitor of the Chicago & North Western, with office at Chicago, died at his home in Evanston, Ill., on February 14. He was born at Whitehall, N. Y., on April 19, 1859, and was educated at Tabor college, Tabor, Ia., Colorado college, Colorado Springs, Colo., and in the law department of the Iowa State university. He entered the legal department of the Chicago & North Western in 1887, working in the state of Wyoming, and resigned in 1903 to take up the general practice of law at Omaha, Neb. Later in the same year he was elected city attorney of Omaha, and served in that capacity until March 1, 1905, when he was appointed assistant attorney of the Chicago & North Western, with the same headquarters. He was promoted to general solicitor, with headquarters at Chicago, on November 21, 1910, and remained in that position until his death.

J. A. D. Vickers, vice-president and general manager of the American Express Company, with headquarters at Chicago, Ill., died in that city on February 16. He was born at Toronto, Ont., on May 22, 1858 and was educated at upper Canada College in that city. He entered the employ of the Vickers Express Company, in Canada, a company of which his father was the founder, as an office boy, in the Toronto office in 1875. During the seven succeeding years he filled practically every position in the local office, and in February, 1882, was appointed superintendent, acting also in the capacity of treasurer and auditor. On February 1, 1889, this company was absorbed by the American Express Company and he became superintendent of the Canadian division, which position he held until May 1, 1891, when the service of the National Express Company was extended over the New York, Chicago & St. Louis and the Grand Trunk to Chicago, and over the Toledo, St. Louis & Western to St. Louis. He was placed in charge of these lines as superintendent of the National Express Company, with headquarters at Chicago. On July 1, 1905, he was made general superintendent and on November 27, 1906, was promoted to general manager, Western department, which position he held until June 11, 1914, when he was appointed vice-president and general manager of the western lines of the American Express Company. His supervision extended from Buffalo and Pittsburgh to the cities of the Pacific Coast and from Winnipeg to the Gulf, with an aggregate of nearly 7,000 offices, 18,000 employees and 55,000 miles of railroad lines.